THE TECHNOLOGY RESOURCE FOR RESELLERS

MAY 1999 Vol.5 No.5

Canadian Computer Wholesaler

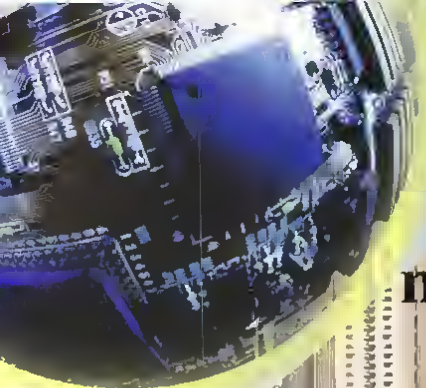
Nifty News about Notebooks!

The Opportunity in Graphics Sales

Are the Networks Y2K-Ready?

DVD

Lab Test: These Drives are Poised for the Mainstream — Check Out the Contenders!



Down to earth motherboards ...for every demanding user!

SPACEWALKER 3 YEAR

Spacewalker™ Hot-591P
- CPU ZIF Socket 7 supports
- VIA MVP3 Chipset
- Supports 66 to 100 MHz Front Side Bus
- AGP Bus x 1, PCI Bus x 3, ISA Bus x 3
- Baby AT Form Factor

Spacewalker™ Hot-661
- CPU Pentium II Slot 1 supports
- Intel i440BX Chipset, ZX and VIA Apollo Pro-Plus compatible
- 4 DIMMs for 1024 MB PC100 SDRAM
- AGP Bus x 1, PCI Bus x 4, ISA Bus x 3
- ATX Form Factor

Spacewalker™ Hot-683 *NEW*
- CPU Socket 370, Intel PPGA Celeron® 300-500MHz
- Intel i440LX Chipset
- 3 DIMMs for 768MB SDRAM
- AGP Bus x 1, PCI Bus x 4, ISA Bus x 3
- ATX Form Factor

Spacewalker™ Hot-681 *NEW*
- CPU Socket 370, Intel PPGA Celeron® 300-500MHz
- Intel i440BX Chipset, ZX and VIA Apollo Pro-Plus compatible
- 3 DIMMs for 768MB SDRAM
- AGP Bus x 1, PCI Bus x 4, ISA Bus x 3
- ATX Form Factor

Call your EMPAC sales representative to place an order today!

TÜV CE USB BMI PCI PnP IR LDCM Shuttle®

1-800-TO-EMPAC | www.empac.ca

Dedicated Knowledgeable Sales Team

Prompt Customer Service

Weekly Specials

Outstanding Technical Support

Sales Personnel 9 a.m.-6 p.m. Mon.-Fri.

Full Service Facilities in Toronto, Montreal, Vancouver

Toll Free Hot Line 1-800-TO-EMPAC

Award Winning Systems

Cost Competitive Solutions

EMPAC

Solutions In Computer Distribution

1-800-TO-EMPAC

Toronto Office
168 Konrad Cres
Markham ON
L3R 9T9
Ph: 905-940-3600
Fx: 905-940-3604

Montreal Office
3385 Rue Griffith
St. Laurent, PQ
H4T 1W5
Ph: 514-345-8558
Fx: 514-345-8551

Vancouver Office
186-4611 Viking Way
Richmond, B.C.
V6V 2K9
Ph: 604-821-0777
Fx: 604-821-0277

CONTENTS

MAY 1999 VOL.5 NO.5

DEPARTMENTS

LETTERS

Thanks for Recognizing Linux!

While not Canadian, I read *CCW* on line each month. I was particularly pleased to see Linux listed among the best at Comdex/Canada West. Perhaps I am biased by the fact that I reside in an area where Linux seems to be making large strides (Red Hat Software is headquartered here), but I think it is commendable to give note to such an innovative and cost effective product.

I look forward to reading more articles dealing with the "other" operating system in the future. Keep up the good work.

Brian D. Thompson
Systems Developer
Raleigh, N.C.

Letters to the Editor

We welcome your letters on industry issues and concerns, as well as your comments on our magazine.
We reserve the right to edit your contributions for length or clarity.
Please write to The Editor via e-mail at ccw@tcp.ca or fax (604) 608-2626.

The Tough Path of Distribution

In the various layers of the computing "channel," one of the toughest jobs has to be that of the computer distributor. While many resellers feel the strain of super-slim margins in a highly competitive world, there's truly not much room to maneuver in that small space between the manufacturers and resellers.

So how do distributors make their money? Definitely by economies of scale. Big volume purchases allow them to get the best possible deals from the vendors. Moreover, by necessity, distributors have taken the mundanities of such things as warehousing and shipping to a veritable science. Some distributors go the extra mile in regards to breadth of product line, to really be a one-stop shop for reseller partners. Others specialize in more difficult (read higher margin) technologies, and offer extra support and integration services.

One recent marriage of two big players is bound to impact the balance of power on the Canadian distribution scene. Last month, Tech Data Canada Inc. announced it would acquire Globelle Corp., in a $37 million deal. It's been approved by Globelle's board of directors and should be finalized by the end of May. The new bulked-up Tech Data should pull in more than $1 billion in Canadian sales annually, which will make the company a strong third in size, after Merisel Canada and Ingram Micro Canada, according to Ivar Kangur, senior analyst for Toronto based market research firm, Evans Research Corp. "We've seen a lot of consolidation in the industry and this is the latest step — probably the biggest step. We suspected somebody was going to get bought out."

Tech Data has been known historically for its networking expertise and VAR focus. Globelle's roots were strongly in components, particularly storage. The organizations are about the same size, with approximately 250 employees and half a billion in sales each.

"We had to be bigger," said Ron Austin, Globelle's president and CEO, explaining the merged organization will be able to command "preferred pricing" from manufacturers.

Rick Reid, president of Tech Data Canada, said the company will benefit from "Globelle's strong presence in mass storage and peripherals," as well as regional representation in Montreal and Vancouver. He said the entire executive teams of both companies will participate in the new organization.

Kangur said Supercom has the best chance to secure number four in the the market. He also noted the importance of Supercom's relationship with IBM, as a configuration facility for that vendor.

A recent Evans study said the Canadian distribution market is expected to achieve $7 billion in revenues in 1999, up from $6 billion last year. In 1998, CPUs and peripherals each earned about $2 billion in revenues.

Other pertinent figures from the Evans study:

- Networking products' sales grew 17 per cent in 1998, over the previous year.
- Storage sales increased 11 per cent, although the study predicts that market will shrink as PCs ship with higher capacity drives.
- Software revenues grew five per cent last year, but growth will slow to four per cent in 1999. That's because more consumers will download their applications directly off the Internet, said the study.

While many vendors fear a fourth quarter slowdown due to market angst over the coming Year 2000, Evans conversely forecasts that revenues will "rise dramatically in the fourth quarter of 1999 due to Y2K-induced purchases. This will be followed by a commensurate drop-off in revenues in the first quarter of 2000, resulting in slightly lower overall growth that year," according to the report.

"Currently, margin erosion is the top issue for distributors," said Kangur. "While distributors are increasing unit sales each year, this increase has been offset by declining cost per unit. With the glut of distributors on the market, not all will survive."

Looking to the future, he predicted distributors will expand their reach beyond the traditional computing products and channels. For example, as computers merge with telephony, and printers converge with photocopiers, distributors will find themselves participating in new markets.

Moreover, Kangur said consolidation will definitely continue in the distribution industry. He added: "There's no visible sign that PC prices will stop falling." CCW

Grace Casselman
Editor

Canadian Computer Wholesaler

Publisher/Executive Editor J. David Ritter
Editor Grace Casselman (grace_casselman@tcp.ca)
Associate Editor Jim Buchok (jim_buchok@tcp.ca)
Lab Test Editor Sean Carruthers (sean_carruthers@tcp.ca)
Contributing Writers Graeme Bennett, Jeff Evans, Dan McLean, Keith Schengili-Roberts, Jacques Surveyer, David Tanaka, Alan Thwaits, Paul Weinberg, Alan Zisman
Copyediting Sharlene Myers
Art Director Sherly Ho
Production Staff Karin Hartwig
Regional Sales Manager Jamie Leighton (jamie_leighton@tcp.ca)
USA & Canada Sales (Toll Free) 1-877-608-2688 Ext.317
National Sales Manager Bill Young (bill_young@tcp.ca)
Advertising Sales Scott Piccolo (scott_piccolo@tcp.ca)
Controller Linda Lovegrove
Accounting Farida Aini
Circulation Kim Jewison
Founders Kent Liqin Chen, Li Ding

Canadian Computer Wholesaler is published 12 times a year by **Gadekin International Computer Publishers Inc.** under licence from Canada Computer Paper.

Toronto Office
Suite 200 — 99 Atlantic Ave
Toronto, Ont. Canada M6K 3J8
Tel (416) 535 8404 Fax (416) 588-8574

Vancouver Office
Suite 503-425 Carrall St.
Vancouver, B.C. Canada V6B 6E3
Tel (604) 608 2688 Fax (604) 608-2686

Taipei Office
PRISCO
Tel 886-2-2721-4833 Fax 886-2-2741 5110

Internet e-mail address *ccw@tcp.ca*
Web Site *http://www.ccwmag.com*

Subscription applications and change of address notices must be made in writing to one of the above addresses.

Free subscription to qualified individuals. $110 per year for non qualified subscribers.

Printed in Canada
Postage paid in Vancouver B.C.
1267628

ccab inc.

LAN VOYAGE 99

THE RESELLER REWARDS PROGRAM OF THE MILLENNIUM

LanVoyage 99 is a program that rewards you for every SMC product sold. Voyage to exotic places where adventure awaits you at every turn or shop through futuristic catalogs of hi-tech gadgetry and games. Selling networking products has never been so rewarding and fun.

With LanVoyage 99, you'll quickly earn points on every SMC product sold. And it requires nothing more than what you're doing already. Just continue selling SMC Networks hubs, switches, and adapters and rack up the points. And with our online web site (**www.lanvoyage99.com**) you can enroll today and begin earning points toward enticing rewards!

Register Today and Win!!

- A chance for a free gift
- Status information
- Special point promos
- Program guidelines and helpful tips
- Virtual rewards catalog

www.lanvoyage99.com

1-800-553-7731

VARBUSINESS ARC ANNUAL REPORT CARD
ARC Award Winner
Ranked #1 Network Vendor by Resellers Across the Country

SMC Networks

GLOBELLE 1-800-46-1616 | INGRAM MICRO | MERISEL | Tech Data

Principle owners, sales managers and sales representatives of U.S. and Canadian VAR's are eligible to play LanVoyage99

INDUSTRY FLASH

Beamscope's in the Agfa Picture!

Agfa, a vendor of scanners, digital cameras and AgfaJet products says its targeting the "traditional photo and retail markets" by signing up distributor Beamscope Canada Inc.

"By aligning with Beamscope, we will be able to accomplish three of our key goals for these markets: expand our channels, grow our market share, and increase our exposure," said Robin McGrath, Agfa's marketing manager, desktop products, in a statement.

Beamscope sells 6,500 consumer electronics products to more than 7,000 retail outlets in Canada.

Xerox will Sell for PC DOCS

Boosting its available document management solutions, Xerox Canada is adding the PC DOCS/Fulcrum suite of products to the Xerox Professional Business Services (XPBS) portfolio.

The products are aimed at mid- to large-sized organizations wanting to implement departmental or enterprise wide document management solutions.

Xerox Canada will offer the DOCS Enterprise and DOCS Fulcrum products through its sales channels, and will focus on such legal, manufacturing, financial services, graphic arts, engineering and the public sector vertical markets. Xerox says it will provide training and support for its sales team on the PC DOCS products.

"Adding the PC DOCS/Fulcrum solutions suite to the XPBS portfolio enhances our ability to meet the growing demand for document management and knowledge management customer applications," said Dave MacDonald, vice-president and managing partner for Xerox Professional and Business Services, in a statement.

The PC DOCS products provide management for corporate and intranet document systems. DOCS Fulcrum is a knowledge management solution meant to improve how organizations access and manage information resources.

Lynn Kauffman, president of PC DOCS/Fulcrum Canada, said "With document and knowledge management technologies now entrenched as mission-critical enterprise applications, this partnership strengthens our ability to deliver real-world solutions across Canada."

Lynn Kauffman, president of PC DOCS/Fulcrum Canada, is pictured here with Dave MacDonald, vice-president and managing partner of Xerox Professional and Business Services.

Cisco and PeopleSoft Collaborate

In an interesting partnership, enterprise resource planning vendor PeopleSoft has teamed up with networking giant Cisco Systems to deliver something called CiscoAssure Services for PeopleSoft.

The middleware is intended to let customers prioritize and protect PeopleSoft data traffic on Cisco networks. It includes policy templates, implementation guidelines and test reports. And Cisco's QoS Policy Manager technology is meant to help organizations control and automate their quality of service.

According to the companies, the initiative lets customers tightly integrate business policies with network behavior, to give organizations greater control of their resources.

Deal will Put Corel WP on 18 Million PCs

An alliance between Ottawa's Corel Corp. and motherboard manufacturer PC Chips Group of Companies, will see an OEM version of Corel WordPerfect Suite 8 ship with an estimated 18 million machines worldwide, starting this summer. (PC Chips operates in Canada through 3D Micro Computers.)

The deal includes a joint marketing campaign on the upcoming WordPerfect Office 2000 and Corel's graphics products and e-commerce solutions, according to Corel.

More specifically, the North American English version of Corel WordPerfect Suite 8 OEM will be included on special jointly-labelled CDs shipped with every computer containing a PC Chips motherboard. There will also be the opportunity for users to get the product in a number of different languages. Moreover, an upgrade offer will be included for WordPerfect Office 2000.

Teaming up for Medicine

Agfa Gevaert NV of Belgium and Mitra Imaging Inc. of Waterloo, Ont., have signed a letter of intent to create a jointly-owned Waterloo-based company called Impax Technology Inc. The new venture will create and deliver software products building on Agfa's Impax software platform — digital networks designed for the communication and archiving of patients' images and data. The new company will also market to other OEMs.

Pictured (from left to right) are John Glass, managing director of Agfa Gevaert's Medical Imaging Business Group, Eric Petersen, president of Mitra Imaging Inc. and president of the new Impax Technology Inc., and Robert Cooke, director of Impax Solutions for Agfa Corp.

Super Fast...

Finally! An affordable line of Laser Printers designed to be quick .. 8, 12 & 17 pages per minute and... no, we're not kidding!

Loaded With Memory... Prints Huge Files!

Now you too can print those huge files... the new Samsung *QwikLaser* Printers boasts 4MB built-in memory expandable up to 76MB using 72 pin standard SIMMs... now that's convenient!

Totally Compatible!

Samsung's new *QwikLaser* Printers are fully compatible with DOS based PCL®5e & PCL®6; Windows®3.x/95/98 & NT 4.x– and the *QwikLaser* 5100A adapts to both IBM and MAC platforms Try *QwikLaser* Printers with your computer, you'll be amazed just how user-friendly they are!

New

QwikLaser Printers

FOR MORE INFORMATION, CALL 1-800-SAMSUNG OR VISIT US AT OUR WEBSITE: www.samsungcanada.com

The Network and Y2K

by Dan McLean

So Your Clients' Applications are Ready for the Millenium. What About their Networks?

It was only a matter of time before the network itself became the focus of menacing Year 2000 bug. And you thought it was just an application problem!

Just when it seemed the painstaking task of wading through a sea of coding was well in hand, yet another segment of the enterprise may be at grave risk.

Since the millennium bug problem is being dealt with, (at least judging by the Y2K research done by International Data Corp.), the focus of attention has shifted. The industry buzz is now focused on Y2K compliance among network hardware and other devices.

Hence, another crisis IT has appeared. Suddenly, corporations realize that even if they fix their applications, the same compliance surgery now has to be performed on the networks. While this one isn't nearly as difficult to fix, it must be addressed — otherwise net works may fail.

The problem is fairly straightforward — older network hardware may have some dating issues. There are essentially two threats with respect to network devices: certain network hardware will still function but may not be able to recognize the Jan. 1, 2000, date, and in the worst cases, devices could fail completely.

Alf Stutzmann, systems engineering manager for Cisco Systems Canada, describes a well-documented occurrence several years ago, when one of Cisco's entry-level model switches experienced a date-related problem. Those switches crashed during the last week of December in one leap year because the devices did not recognize the 366 days in that year. The switching software attempted to create a 53rd week and simply could not. "It actually brought quite a number of customer networks down and our technical assistance centre was able to isolate the problem and fix it within six hours," Stutzmann says. "That's the type of thing that could happen to customers if they don't thoroughly test (their equipment) for Y2K date compliance."

Stutzmann explains that, for older Cisco gear, Y2K compliance means installing a software revision patch. For hardware that can't be upgraded through a software patch, swapping out the old equipment is probably the answer. Fixing the millennium bug in network hardware is about as simple as that.

However, the most challenging aspect of ensuring Y2K compliance in network hardware is the legwork involved in actually tracking down all the equipment that needs to be fixed. That's why a good plan of attack needs to be formulated.

Start by determining what network hardware your clients have. That might require dispatching techies out to every branch office and business outpost within the enterprise. Armed with notepad in hand, they'll have to seek out and scribble down the model numbers of every router, switch and hub they can find.

From there, determine which devices will be affected by the millennium date change. For Cisco equipment, for example, Stutzmann suggests checking the company's Web site for model numbers of any equipment that may be impacted. In addition, users can download the Y2K compliance software (version 11.0 or higher). "Once they gather that information, they need to put together a lab and actually test the equipment."

But don't rely on a vendor's say so, Stutzmann advises. Check for yourself. Even after installing a Y2K compliance patch, test the equipment just to make sure.

Even if your clients have done nothing to ensure their network hardware is Y2K compliant, there's still time to get the job done. Take a disciplined approach. Design a plan. Set target dates to complete the testing of all equipment, as well as deadlines for when it will be upgraded and when the entire network infrastructure itself is to be made compliant. Once you've done these tasks, then lock the infrastructure. Don't change or introduce anything to the network topology until the new year.

As with most Y2K issues, larger companies are much farther along than smaller businesses in terms of meeting the challenge. For example, Stutzmann says most of the banks and insurance companies he's worked with have typically followed a plan in which all network hardware was tested and upgraded by the end of 1998, with final compliance scheduled for mid-1999.

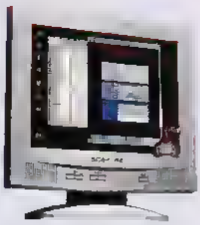
"I think those companies that fail after Jan. 1 are companies that don't know how to plan and execute a project." CW

Dan McLean is research manager of network support and integration services research for International Data Corp. (Canada) Ltd. in Toronto. He can be reached at dmclean@idccanada.com

"Excellence For All The World To See"

Promotion!*

SCEPTRE



Choose from a variety of LCD panels

Choose from a variety of WinPlay series monitors

Choose from a variety of Dragon Eye series monitors

With

SCEPTRE'S #1 NATIONAL DISTRIBUTOR

Purchase any Sceptre product from White Knight Distributing and receive an Entry Form - to win!
One product = 1 entry form
The more entry forms, the better the odds of winning!

Weekly Prizes

Mascots and "T"s

Monthly Prizes

Great Sceptre Monitors

Grand Prize

Round Trip for Two

Starts March 15th, 1999

For more details:
Visit our website or call your local sales rep.

www.white-knight.com

Western Canada
105 3760 Jacombs Road
Richmond, BC V6V 1Y6
1 800-668 6188

Alberta Office
4710 14th Street NE
Calgary AB T2E 6L7
1-800-668-3381

Eastern Canada
245 W. Beaver Creek Rd.
Richmond Hill ON, L4B 1L1
1 800 852 5039

Halifax Office
#21 - 10 Ackerley Blvd
Dartmouth NS. B3B 1J4
1-800-735-0250

WHITE KNIGHT DISTRIBUTING
A Div. of Great Pacific Trading Ltd

Authenticity
in the Age of Spoofdom

by David Tanaka

Is it real? Is it genuine? In the digital age, it's often difficult to say. However, as we move forward along this path of zeroes and ones, the issue of the authenticity — of the user and the information itself — will become a central one. And as solutions to this problem are developed, new opportunities to add value are arising for resellers.

Faking the Information

Of course, fakes, forgeries and hoaxes didn't begin with the advent of computers. Computers just make it easier to perpetrate such scams. Take the doctored photograph, long a staple of the gossip tabloids even before personal computers came on the scene. Programs like Photoshop simply made it oh-so-easy to assemble that starlet's body with this starlet's face, to add or remove elements from a photographic scene, or to create an entirely fictitious but realistic "photograph."

We used to believe that a photograph never lies, but in the digital era we are wary that the exact opposite might be true. A few years ago, there was a photo "restoration" service being advertised where a person could have ex-lovers, ex-spouses or ex-significant others removed from personal photographs. We might laugh at this, but for people that rely on the authenticity of a photographic image — police at a crime scene or insurance adjusters investigating a claim for example — this is problematic.

> "We used to believe that a photograph never lies, but in the digital era we are wary that the exact opposite might be true."

Last month, Epson announced its Image Authentication System (IAS). The IAS, according to Epson, adds a "digital fingerprint" to JPEG files. The IAS will alert the user if even a single pixel of the image has been altered. IAS has two components: one is a driver loaded into the digital camera (IAS will work with Epson's PhotoPC 750Z and PhotoPC 700 cameras) while the other is installed on a PC running Windows 9x or NT.

When a picture is taken by an IAS-enabled camera, a digital fingerprint is embedded in the image file. Then, any PC with the IAS software installed can determine if the JPEG file is an untampered version. The IAS system will retail for about $159.

Dave Prosser, a brand manager with Kodak Canada Inc., says one of the reasons why the Kodak's DC-120 digital camera — now reaching the end of its product life — had continued success was because it recorded images in a proprietary .KDC image format. If you opened the file in an image editing program, you could not save it back as a KDC file. Therefore, one could be reasonably sure that a KDC file was an original image file.

Prosser says image authentication adds "one more level of credibility," but also points out that you can only take it so far. People determined enough will find other ways to create believable fakes. If you staged or doctored the subject being photographed, for example, you would end up with an irrefutably original picture of an entirely false situation.

Faking the User

Like faking a photograph, faking an identity is an age-old scam, but one that's particularly troublesome in the digital era. We hear stories of perverts assuming the identity of a kid in order to interact with other kids in chat rooms, or pranksters hacking and then using someone's ISP or email account.

In the corporate setting, user authentication has been a longstanding concern, and with the coming of e-commerce, will become even more important. And into this market comes Montreal-based E-Z Lock PC Inc., with a Smart Card-based PC security system. According to Daniel Sommer, general manager of the company, the system uses smart card technology similar to what is used in some European bank cards.

The Smart Cards will hold up to 10 kilobytes of information, such as access privileges or passwords. As a network passkey system, E-Z Lock works like other passcard systems. The user slides a smart card through a reader, enters a PIN, and gains access to all the resources matching the profile. Sommer says several people can use the same computer workstation, with the information contained in the smart card controlling which resources any single person has access to.

As e-commerce becomes more common, Sommer says smart card security information will be able to provide a second, independent layer of user authentication for on-line transactions. CCW

Contacts
Epson Canada: 1-800-463-7766, *http://www.epson.com*
E-Z Lock PC Inc.: 1-888-931-9502, *http://www.ezlock.com*
Kodak Canada: 1-800-465-6325, *http://www.kodak.com*

David Tanaka is a regular CCW columnist and is Editor of The Computer Paper. He can be reached at david_tanaka@tcp.ca

The Most Reliable & Safest CSA approved Cases

LR 103134

LX-3D/Server 27" | SX-3/ATX 27" | LX-2/ATX 19" | CTA-2/ATX 19" | LX-1/ATX 16" | CTA-1/ATX 16" | HX-1/ATX 16" | TH-762/ATX 17" | 101A/ATX 20" | 101E/ATX 19" | 101C/AT 15"

CF-7001 CF-7041 CF-7021 EXTERNAL SCSI STORAGE | 19" INDUSTRIAL RACK-MOUNT CHASSIS | 718P/ATX 16" | 811P/ATX 16" | 511P/ATX 16" | SRC 1000C 21 BAY CUBE | SRC-1000 10 BAY | SRC-1200 12 BAY | SRC 1400 14 BAY

ALUMINUM MOBILE RACK IDE/SCSI/WIDE SCSI/ZIP | PLASTIC MOBILE RACK IDE/SCSI | CPU COOLING FAN PENTIUM 3, CEL PENTIUM SLOT FAN | POWER/CASE FAN 4cm, 6cm 8cm, 9cm SLEEVE/BALL BEARING

CD-RW | CD-R | CD R/S/P/NDLE 50 PAC | MLI SUBWOOFER MLI-MX | MLI SUBWOOFER MLI 450 | HDD MOBILE RACK TF-10

EXTERNAL CD ROM STORAGE | INTERNET HEADSET MIC/VOLUME | DESK TOP MICROPHONE | SWITCHING POWER SUPPLY REDUNDANT P/WAT, ATX, SQUARE/SIDE SWITCH

LCH L.C.H. Resources Inc.

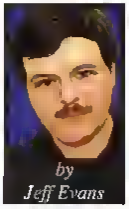
#9 - 13511 Crestwood pl. Richmond B.C V6V 2G1

TEL: (604) 278-0708 • FAX: (604) 278-0305 • WEB SITE: www.lchres.com

Column

The Billion Dollar Silver Lining

How Symantec and IDG Books Have Profited from the Holes in Microsoft Windows



by Jeff Evans

As the anti-trust actions against Microsoft approach a climax, it's easy to forget that in the computer industry, along with those who have been beaten up by tough business practices — there are those who have profited mightily from Microsoft's limitations and weaknesses!

In recent weeks, I had the opportunity to speak with leading executives from two companies that between them have literally earned billions of dollars making Microsoft Windows products and Wintel computers and networks more usable for the average person. John Kilcullen, CEO of IDG BooksWorldwide, and inventor of the *Dummies* line was in Canada recently, and Chris Monette, general manager of Symantec Canada, invited *CCW* to a year-in-review briefing to outline his company's recent progress and future plans.

Kilcullen, whose boyish enthusiasm masks a very keen business mind, has been a catalyst in building the *Dummies* brand into a global franchise, and at the same time, has made computer "how to" books into one of the most dynamic genres in book publishing. Ironically, the computer, instead of spelling the doom of traditional print, has spawned a vast publishing industry devoted to explaining the mysteries of information technology. Kilcullen was inspired to create the original *DOS For Dummies* book after hearing a frustrated PC user exclaim that he wished that there were computer manuals that even a dummy could understand. He had the insight that everyone feels like a dummy at some point, when confronted with obscure, hard-to-use computer hardware, software and user manuals. Why not admit it and then provide fun, easy-to read, genuinely helpful guides to using technology as painlessly and productively as possible? The *Dummies* line was born, and with the help of talented writers and designers Kilcullen has produced hundreds of titles that have sold more than 60 million copies worldwide. Always searching for new market opportunities, Kilcullen has leveraged the *Dummies* brand into an expanding line of non-technology oriented *Dummies* titles, ranging from *Sex for Dummies*, *Gardening for Dummies* and even *Beer for Dummies*. A quick walk through most Canadian bookstores reveals the characteristic yellow and black *Dummies* titles sprinkled through many different sections in addition to the computer book aisle. IDG Books also produces a wide range of differently formatted computer references outside the *Dummies* line, including its "*Bible*" series. IDG's Web site also attracts huge numbers of repeat visitors and provides a cheerful, intelligent soft sell for IDG's brands and products, and delivers large numbers of customers to IDG's channel partners. Kilcullen sees the Web as an indispensable aid to retailers' success in the future, whether they do their business on-line or from a bricks-and-mortar store. He feels that in the book trade, customers will want room for both on-line e-commerce and traditional bookstore browsing. Both on-line and real-world shopping experiences are valid approaches, he believes. On-line, Kilcullen believes in context as well as content. If a Web site has good content, customers will probably come once, to take a look. If the site has an appealing context, with constantly new information presented in an appealing, entertaining and enjoyable environment, then the customers will not only come, they will come back.

Kilcullen is always on the lookout for new publishing opportunities, and for authors who can sense new trends and needs in the market for IDG to serve. IDG Books Worldwide has increased its interest in Canada, in the literal sense by investing in its Canadian distribution partner, Macmillan Publishing. The Canadian market represents about 40 per cent of IDG's international sales, and Kilcullen is aware that even in the age of the Internet, understanding the local market is critical to success.

Symantec Canada has also recently benefited from a corporate re-commitment to localizing sales, marketing and channel relations. After buying Canada's Delrina Corp. for around $500 million in the mid-'90s, Symantec seemed to flounder for awhile, releasing a version of WinFax Pro with serious bugs, and paring back the Canadian office staff. Over the last year, Symantec has released virtually a complete new slate of product versions, including a well received version of WinFax Pro, and new versions of its Norton line of Windows and Mac utilities. In his year as head of Symantec Canada, Monette has worked hard to listen to the channel and the end-users, and has fought for resources and personnel for the Canadian market. The result has been rapidly increasing sales, better channel representation and increased reseller and end-user satisfaction.

Both IDG and Symantec have chosen the route of creatively exploiting the opportunities offered by rapidly evolving technologies — nimbly maneuvering around the feet of giant competitors.

Based in Toronto, Jeff Evans can be reached at jeff_evans@tep.ca.

YOUR ONE-STOP SOURCE!

Broad Selection • Competitive Prices • Brand Names

Exclusive Distributor of Sceptre Notebooks in Western Canada

SCEPTRE

Westcoast Service Center

The Sceptre S6500 • S6800 delivers sizzling performance for a notebook computer. Throw in good ergonomics and you have a notebook computer that really can substitute for a desktop system.

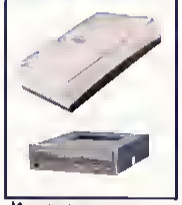
Soundx 6500 • 6800

PENTIUM II 300/333/366MHZ/CELERON 300MHZ

- 14.1" XGA Active Matrix TFT Display
- 64MB SDRAM
- 6GB Ultra ATA Hard Drive
- Removable Combo 2X DVD-RDM Drive and 3.5" Floppy Disk Drive
- New 2X AGP 4MB ATI Rage Pro 3D Video
- ESS 3D Surround Sound and Hardware Wavetable
- Intelligent Lithium Ion Battery
- Carry Case
- PCMCIA 56K V.90 Fax
- Microsoft® Windows® 98
- Touchpad

Recommended, CRN Test Center Oct. 1998

Scanner/CD ROM



KOMODO SCEPTRE

K600/K1200 30 bit Color
600x1200 DPI SCSI II Interface
User friendly

LITEON CD-ROM 40X & 48X

LCD

Also available in black

SCEPTRE

Space saving, high resolution
no radiation, flicker free, static free, no AC/DC adapter to interfere with signal, wall or desk mounted

Award Winning

Monitor

15" 17" 19"
Dragon Eye Monitor

SCEPTRE KOMODO

Manufactured by Sceptre
Resolution at 22", 25" & 27"
1280x1024 & 1200x1800
Multimedia speakers attachable

Notebook

One of top 5 Tier 1 OEM notebook manufacturers

SOUNDX SCEPTRE

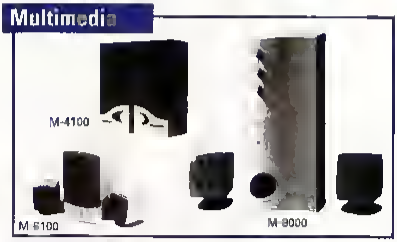
P150 – PII 300, 266/w AGP & DVD
Intered Part, 128 Bit Neo Magic
14.1" 13.3" TFT

PCMCIA Cards

CADMUS

DVD MPEG2 PC Card
56K+10BASE-T Combo Card
56K Dual mode (V.90 & x2) Fax Modem
10/100 Mbps Ethernet

Multimedia



MICROMEDIA
1999 MULTIMEDIA PRODUCT LINE
www.mmcor.com

EASTERN
www.easternmulti.com

JNT also available

Cases & P.S.

KME

Tower or desktop ATX cases Rack Mounted ATX cases
22" & 28" ATX server cases are also available

Keyboards

LITEON Proxcel

SK 2501 Multimedia Keyboard
Windows98 Keyboard available
in English and Chinese
Wireless Keyboard available

Dealers Wanted

LAPRO Marketing Corp.

120 - 3771 JACOMBS ROAD, RICHMOND, B.C. V6V 2M5 TEL: (604) 231-1628 FAX: (604) 231-1636

Web Site http//www.lapro.com

Serving Canada for 5 years

Lexmark's Ink-Jet Initiatives Push Image Quality and Price

by Sean Carruthers and Grace Casselman

Lexmark Canada Inc disclosed plans to push the standard on ink-jet printing one step further during a recent product briefing for Canadian media at the Lexington, KY, headquarters of its parent company, Lexmark International Inc.

The newly announced Lexmark Z51 printer, for instance, is positioned as a business-level ink-jet. It allows the user to print on many different media types, ranging from 16-pound to 150-pound paper — from onion skin to heavy card stock. It's allegedly jam-proof, and supports duplex printing at speeds of up to 10 pages per minute for black text, and 5 ppm in color. In addition to the parallel connection to the computer, the Z51 is the first of Lexmark's ink-jets to use a USB connector. The printer also features a resolution touted as "1,200 dpi plus." This is essentially 1,200 by 1,200 dpi resolution, with image quality enhanced by a smaller droplet size. "There are 12,000 fires per second, per nozzle," said John Zbrozek, vice-president of research and development for the consumer printer division. That resolution positions the product for photo-realistic prints, says the company. "Image quality is getting better and better." He added. "That will soon cease to be a differentiator. We're all very good." The Z51 is priced at about $399.

On the consumer end, the Z11 model means to bring higher-end technology to market at a lower price point. Two of Lexmark's key selling points for the higher end of its ink-jet line have been 1,200 by 1,200 dpi resolution and the Accu-feed media-handling system. Now both of these features have been introduced into the budget-oriented Z11, priced to retail at $149.

Despite these higher-end features, the overall cost of the unit is being kept down by a slower print engine (a maximum of 4 ppm for black text) and a single-cartridge print system (black and color cartridges must be manually switched).

Lexmark has also recently issued some other printer products. The Optra E310 is a $649 laser printer aimed at a more budget-oriented laser buyer, and is another new Lexmark printer using the USB port. As far as ink-jet goes, the 5700 model has been enhanced with an attachment that will read digital camera media directly (both SmartMedia and Compact Flash cards are currently supported). This model is available for $549 and allows the user to print digital camera pictures without requiring the printer to be hooked up to a PC.

Originally owned by IBM, Lexmark became independent in 1991, and has gone on to establish a name for itself in the printing field, first with laser technology, and later with ink-jet printers. In that time, Lexmark has increased its profile to the point where its 1998 revenues topped three billion dollars.

According to Belinda Snell, research analyst for Toronto-based market research firm, Evans Research Corp., Lexmark was fourth in the overall Canadian printer market last year, with 11 per cent share, following Hewlett-Packard, Canada and Epson.

She said Lexmark was also the fourth leading vendor of ink-jets in 1998 (after HP, Canon and Epson). "Fourth quarter shipments grew by more than 70 per cent over the previous quarter. ERC believes that the 3200 Color Jetprinter was an extremely popular product over the Christmas season due to its many built-in features."

After HP and Tektronix, Lexmark was the third leading vendor of color lasers in Canada in 1998, said Snell. "Lexmark is making great progress in the color laser market. The SC 1275 (a low-cost, fully-networkable color laser) was a hot-selling product in the fourth quarter of 1998... and Lexmark's shipments grew accordingly." In monochrome lasers, Lexmark was second only to HP, Snell mentioned the Lexmark Optra S series of laser printers as a particular success in terms of volume shipments.

Moreover, she said Lexmark was third in Canada for dot-matrix printing, following Okidata and Epson.

In other news, Evans has reported 685,000 printers were shipped in Canada in the fourth quarter of 1998. CW

Sean Carruthers is Lab Test Editor and Grace Casselman is Editor of Canadian Computer Wholesaler.

The Real Profit Source: Supplies!

The consumables market is expected to grow 23 per cent this year, and average 20 per cent annual growth through to 2001, according to Evans Research Corp.'s report *"The Printer Supplies Market in Canada: 1997-2001."*

Indeed, the report said alternative suppliers "control a sizable portion of the consumables market in Canada" and are the real threat to HP in that market-place.

"Growth in the printer supplies market is being driven by the ink-jet and laser consumables segments, which increased by 42 per cent and 35 per cent respectively in 1998," said Bill Fournier, Evans' director of research, in a statement. "By 2001 ink-jet supplies will overtake laser toner as the largest market segment."

According to Evans, Canadian printer revenues totaled $462 million in 1998. Of note: HP achieved only 29 per cent of laser supplies revenues, despite the fact it earned 55 per cent of laser printer revenues. However, HP and Lexmark kept 99 per cent of their ink-jet supply markets, but Epson and Canon lost nine and seven per cent respectively, said Evans.

To Clone, or Not to Clone?

by Paul Weinberg

These days, non-branded PCs are really no more than $50 to $100 cheaper than some of the equivalent name brand models from vendors like IBM and Compaq. Yet, consumers are still buying the so-called clones, white boxes or private label desktops.

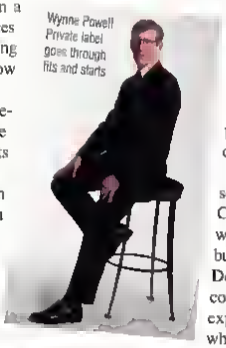
Calvin Wayne can't figure it out. He's the account manager for Markham, Ont.-based research firm A. C. Nielsen & Co. (Canada). He estimates that last October, sales for the non-branded in the channel were up 11 per cent from the same time in 1997 and they represented about 15 per cent of the revenues generated by resellers and retailers from PC sales in this country. Christmas may have put a dent in the purchases of non-branded or "no name clones," as their popularity always stemmed from their lower prices, suggests Wayne.

"I wonder if there is a delay in the [impact.] It may be better reflected a few months from now."

Computer industry experts differ on the relative strength of the non-branded systems. But they agree that it is on a steady decline since the recent narrowing of PC prices. Richard Morochove, president of Toronto-based consulting firm, Morochove & Associates Inc., cites figures that show four out of 10 desktops sold in Canada are clones.

There is generally little difference between a name-brand and a non-branded desktop machine, quality-wise. Makers of both categories of PCs often buy components from the same sources in Asia.

Nonetheless, it appears the non-branded PC is a victim of its own success, as its manufacturers have been beaten at their own game of price-cutting.


Wynne Powell: Private label goes through fits and starts.

The top PC vendors have introduced attractive programs, incentives and training initiatives to wean resellers away from their fixation on the non-branded, says Mark Sheinfeld, senior vice-president of operations at the Ottawa-based SHL Systemhouse Inc. "Over the last number of years, they have been conscious of what resellers have been saying. Which is: 'These clones are taking away a share of our common market-place and you have got to do something about it.'"

Clone makers and the resellers carrying their products cannot afford the same kind of advertising and co-op marketing programs that name-brand vendors have successfully introduced into the channel to push their products, states Bob Pritchard, president of the Kingston, Ont.-based consulting firm, R. J. Pritchard & Associates.

Wynne Powell is chief executive officer for the Vancouver-based London Drugs chain, which in addition to name-brands has its own Certified Data private-label PC models, built and configured to the customer's specifications. "Private label goes through fits and starts, depending upon the individual private labeler and the market conditions. When AST in Canada dropped its supply, the white box market grew because there was a vacuum of product need."

The fact that both Evans Research Corp. and International Data Corp. (Canada) Ltd. are conducting major studies of the non-branded PC market in Canada is a sign that somebody in the PC industry is taking this area very seriously and is willing to pay for the information. At Evans, research director Bill Fournier, says name-brand vendors tend to underestimate or dismiss the presence of the non-branded in the PC market, both at the consumer and corporate ends. "The multinationals know that it exists, but they are too busy battling [among themselves]."

Toronto-based reseller, Infinity Technologies Inc., has offered a combination of name-brand PCs including IBM, Compaq and Hewlett-Packard, along with its own private-label brand for the past 12 years and it does not appear prepared to end this practice soon. Sales manager Frank Abate says the non-branded PC is still a good business to be in because it is targeted at a unique set of customers. "Clones have a place, even at a reseller level, by augmenting supply. They're an alternative to name brands, not a replacement."

Abate suggests that name brands promise consistency in parts, national service agreements and longer product life cycle, but they are limited to standard models. He contrasts that with private-label desktops, which are built to the customer's customized requirements within a short time frame. Infinity, for instance, builds a PC within a two- to six-day period.

As IBM and Compaq dither on how to introduce build-to-order into Canada, resellers like Infinity have filled the breach in the market with their own private-label offerings. "In one way, it is the reseller's answer to Dell. One of Dell's selling points is that it can configure to the buyer's specifications," says Morochove.

Fournier agrees that "flexibility" is the key reason why private labels will survive. "IBM and Compaq can lower the price all they want. That is not why they are losing business. It is because they cannot build product that is outside their normal SKU." Demand for customized PCs, continues Fournier, comes from both the sophisticated SOHO seeking to expand an existing network and corporate customers, who are buying no-frills computer boxes for their point-of-sale systems.

At Future Shop, which also offers build-to-order, customers are asking for improved storage, speed and performance, says Eric Ommenson, director of corporate relations for the countrywide chain. "Somebody might be looking for an extremely fast modem or an extremely large drive and they don't care about some of the other features, like multimedia."

London Drugs is targeting its own build-to-order Certified Data private label at the sophisticated consumer. Powell says a private label provider can jump ahead of the pack in terms of providing leading edge products. "We can bring new high end computers to market many times faster than the major manufacturers."

Many major distributors lack the facilities to assemble their own house brands, says Frank Luk, president of Toronto-based Supercom. But his company puts together desktops for channel clients.

Some private label resellers, for quality-control reasons and other reasons, prefer to have the entire assembly of a private-label PC done on their premises, rather than subcontract the work to a third party. Says Abate: "Our attitude is, if we sell a clone, let's sell our own."

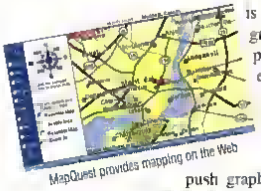
Paul Weinberg is a Toronto-based journalist who specializes in high-technology. He can be reached at pweinbg@interlog.com

Graphic Opportunities, in Software!

by Jacques Sauvageau

Graphics are bursting out all over the computing scene.

In its latest Pentium III chips, Intel Corp. adds yet more special graphics processing instructions to a line that's already equipped with MMX-MultiMedia eXtensions. This is to take advantage of the flood of graphics images already being processed over the Internet. And even more are used in every aspect of day-to-day business processing — where indeed a picture is worth a thousand words.



MapQuest provides mapping on the Web

And consumers continue to push graphics, with games leading the way into super-realistic simulations and very high-resolution graphics cards. But there are other sources of demand, most notably digital cameras. For example, the new 1,000 by 1,000 (1,000 dpi for $1,000 or less) digital cameras make images readily available for a whole class of novel uses: e-mail greetings, event albums, pictorial calendars, asset inventories, birthday banners and sell-that-item flyers. Finally, 3D graphics are being taken into high payoff applications like OLAP visualization of data trends, process control, simulation of production or distribution set-ups and the whole Web VRML world.

Mapping Software

AutoCAD, the front runner in computer-aided design, is also a major player in mapping and GIS software. Many engineering designs require elaborate and precise site layouts and this naturally has progressed into surveys, contour maps and general GIS. But major mapping players like ESRI and MapInfo also see consistent growth in mapping applications.

- Autodesk's AutoCAD Map R3 (*http://www.autodesk.com*) provides sophisticated mapping and links in CAD to existing map info sources.
- Autodesk's World R2 is a map and graphics acquisition, analysis and display system with VBA & COM interfaces.
- ESRI's ArcLogistic Route 1 (*http://www.esri.com*) is a map-based solution for complex vehicle routing and scheduling problems.
- ESRI's ArcView GIS with links to SAP/R3 is premier business mapping software that taps SAP's ERP data.
- MapInfo's MapXtreme (*http://www.mapinfo.com*) is server-side mapping and spatial analysis with robust Internet/intranet access.
- MapInfo's Professional V6 with MapBasic provides analysis and display of geographic and demographic trends.

Of course, the Web has had a dramatic impact on mapping software as the major vendors allow their mapping engines — with top display and analysis capabilities — to be brought to the Web. Now, the smarts and mapping is done at a central server which ships back a static map image to be included in a Web page. But for more sophisticated analysis and queries, more Web maps are being provided with Javascript or Java applets to allow users to interact with the maps quickly on their local PCs. New cable and ADSL modems with 20 times improvement over 56Kbps modems will only enhance mapping opportunities. Mapping is a natural market move for VARs involved in data warehousing or Web development, where a little expertise can deliver major impact to customers' systems.

Books:

Photoshop 5 Wow Book, Dayton and Davis — Peachpit Press, $75
Director X for Mac and Windows — Visual Quickstrat, $30
The Non Designers Guerilla Marketing Book, Williams — Peachpit Press, $38

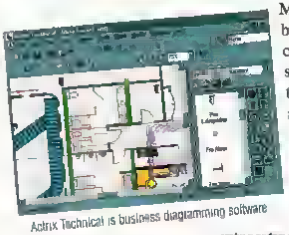
Web Sites:

http://www.graphic design.com/ (great coverage of 2Dgraphics and desktop publishing)
http://www.howdesign.com/ (graphic design site and magazine)
http://www.3dspot.com/main.html (3D sources galore)
http://desktoppublishing.com/open.html (desktop publishing resources)

3D Moves Into the Multimedia Mainstream

There are a wide range of old and new players Perhaps the most striking incident has been the purchase and then divestiture of SoftImage by Microsoft

A great number of movies and TV shows are using 3D graphics and animation. Convenient graphic objects are now a fixture in multimedia processing. Thus diverse products such as Adobe Premiere 4, Macromedia's Director 7, Kinetix 3DStudio MAX 2.5 and MetaCreations' Infini-D 4.5 must balance and control the modelling of 3D objects, render their skin or surface with realistic lighting and textures, animate their movement and behaviors according to believable kinematics, blend in real-sounding voices and audio effects, and finally add transitions, text and special effects



Actrix Technical is business diagramming software

Without graphic objects, this integration becomes rigid and constrained Even with graphic objects, the world of 3D can quickly spin off into specialty categories like MetaCreations' Bryce world of landscapes and specialty terrain, MetaCreations' Poser 3 animal and human forms with realistic clothes and movements or Cinema 4D's path dynamics

Some VARs stay strictly on the hardware and placement side where 3D's voracious demands for processing power and specialized skills deliver top margins But remember, the technology in the field moves awfully fast

Addressing Games to Business

As a quick glance in any of *PC Gamer*, *Computer Gaming World*, or *Computer Games* magazine will show — PC-based games are graphically alive and well on their way to very realistic 3D animation and productions. The realism in games of action, racing and are flight, strategy and tactics, plus other world simulations is staggering Even more so is the push effect games have on graphics hardware and software in general On the hardware side, state-of-the-art 128-bit cards with 32MB of graphics RAM arrived first in the game stations and are just now migrating to PCs. Likewise, Direct-X, Open-GL and the new Pentium III graphic instructions have (or will) see first major use in gaming then move to commercial and business applications.

Here are three major examples where gaming-inspired advances have come to business graphics:

- Computer Associates with TNG took a gamble that 3D visualization in system software would be essential The competitors are scrambling to catch up
- Cyberheart simulation, the brainchild of Oxford Professor Noble, shows how simulation and 3D visualization can make the intricacies of complex biochemical interactions and calculations come astoundingly to "real life" while providing keenly needed insights into a wide range of phenomena worth fortunes to pharmaceutical and medical researchers
- Flowcharts to animations to complex business process simulations is the path being taken by Micrografx's new Igrafx line of products that bring new realms of visual insights into business problems

In fact, business diagramming and flowcharting have improved steadily with products like Autodesk's Actrix with Active Shapes, Micrografx's Flowcharter with Smart Links and Visio's Visio Enterprise with Smart Shapes All of these have extensive templates of "smart" shapes (they stay glued and/or re-orient themselves when a part of a diagram gets shifted or changed), drag-and-drop ease of operation and VBA for macro and scripting support Visio, the pioneer in smart shapes, has the most extensive library of more than 14 000 shapes, many of which are exact product replicas used in its Network Auto-Discovery and Guided Update technologies With Visio Enterprise's new UML and data modeling extensions, Visio does become a compelling information architecture and modelling tool Actrix, on the other hand, takes advantage of its affiliation with AutoCAD by using DWG drawings as guidelines for its much smaller but perhaps smarter set of shapes, which cluster in the engineering and facilities management arena But perhaps the most promising in this area is Micrografx, which has taken diagrams and flowcharts first to animations and now to simulations of business workflow and operations with its Flowcharter and NewSim products.

Other vendors like Ditek and IMSI are offering very carefully targeted products for such segments as accident reconstruction or landscape design In sum, with training and VBA scripting as openings, the opportunities for consultants and VARs engendered by business graphics programs are very rich indeed.

Classic Drawing, Illustration and Raster Graphics Programs

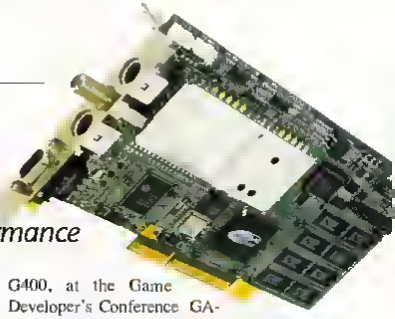
Things were getting dull and same-old in illustration and picture graphics software But no more Graphics objects technology has changed all that The worlds of desktop publishing (Adobe Pagemaker and Framemaker, Corel Ventura, and Quark Express), vector drawing (Adobe Illustrator, CorelDraw, Deneba Canvas, Micrografx Designer, and Macromedia Freehand) and raster images (Adobe Photoshop, Corel PhotoPaint, MetaCreations Painter, Micrografx PicturePublisher) have been converging — but rather slowly For example, Adobe Illustrator has extensive tiling and mapping of raster images, likewise CorelDraw adds spellchecking and text frames, while Macromedia Freehand offers extensive text with vector curve options.

But with graphic objects, the programming and treatment of raster, text and vector objects becomes hidden and transparent Exciting new programs like Adobe's Imagestyler and InDesign, Macromedia's Fireworks and Ulead's PhotoImpact start to show how treating raster, text and vector graphics transparently can lead to innovative new features But Deneba's Canvas 6 is the program that has carried this merger of DTP, CAD/illustration and photo manipulation to its logical conclusion With graphic objects, Canvas 6 allows vector curves and photo images to be combined in very powerful ways or with transparencies to be blended or filled The ease and new richness of expression allowed in Canvas 6 and other new breed graphic programs is changing the whole 2D graphics market, just as digital cameras and Web publishing is increasing demand

Graphics software has again started to accelerate innovation as graphic objects and new sources of demand — especially from entertainment, advertising and the Web — stimulate the field Pick your market niches well as the need to stay up with the latest technology becomes more daunting, but don't lose focus Fortunately, the need to supply product sets — hardware and training, software and customization, ongoing project management or specialized mentoring — can provide opportunities for some very graphic profits CW

Canvas 6 combines vector text and raster graphics

Jacques Surveyer is a consultant and graphics artist who chats graphics at www.inforamp.net/~jbsurv.



2D/3D Graphics Cards for Q2!

A new Crop of Chips Power Up 3D Performance

by Graeme Bennett

Take note! ATI, NVidia, 3dfx, Matrox, 3DLabs, S3, Intel and others have all announced new generations of graphics chips to supersede their 1998 offerings.

In February, Toronto-based ATI Technologies announced a new lower-cost addition to its family of graphics cards based on the Rage 128 chip and claimed the new card would be available at retail later that month. Then in March, the company said the retail version of the card would be delivered in "a couple of months." By our reckoning, that means May at the earliest. The XPERT 99, when it arrives, will come in an 8MB configuration — an AGP 2X version with an estimated street price of $149. Like the higher-priced Rage Fury and All-in-Wonder 128, the XPERT 99 supports hardware decoding of DVD and both 2D and 3D accelerated output. ATI says its forthcoming All-in-Wonder 128 will include software to allow real-time MPEG-2 encoding in connection with a Pentium III class CPU and the TV in/out abilities of the graphics card. ATI says the card will be available this spring for US$249 and US$299, in 16MB and 32MB versions, respectively. Additionally, in early April, ATI announced the Rage 128 PRO, the latest addition to its Rage 128 line of graphics chips. The company says the processor, due in July, offers 50 per cent improvement in 3D performance over the Rage 128.

Also feeling the pressure to pre-announce products, in April, Montreal-based Matrox Graphics Inc. revealed the successor to a chip it hasn't even shipped yet. Matrox trumpeted the launch of the new Matrox G400 MAX, a higher speed version of the as-yet-unavailable Matrox G400 graphics chip. The Matrox G400 MAX, the company says, benefits from an increase in raw speed of more than 30 per cent over the Matrox G400.

In related news, the ATI Rage 128 products for the Mac OS, which were to be available by the end of March, were also delayed to May, due to software "issues."

Cards based on the NVidia TNT/2 are starting to reach the market. Tomshardware.com took an in depth look at a pre-release version, and concluded that it has what it takes to steal the crown from 3dfx as the performance leader in 3D. Note, however, that the board Tom Pabst took a look at was based on a TNT2 chip clocked at 150MHz. Guillemot International subsequently announced its US$229.99 Xentor RIVA TNT2 32MB AGP board (with an expected April 25 release date).

Elsa has an upcoming product called the Erazor III based on the chip, which will include real-time MPEG-2 encoding capabilities. Meanwhile, 3dfx, one of the best-known brand names of the computer hardware industry, kicked off a US$20 million ad campaign with a splashy new logo and a series of hilarious TV commercials to promote its new Voodoo3 family of chips. According to VoodooExtreme, the new cards significantly outperform NVidia's (original) TNT on 3DMark '99 and Quake2 benchmark tests.

A 3dfx spokesperson confirms there will be three versions of the Voodoo3, with the two high-end models requiring a computer with an AGP slot. The company is shipping graphics boards based on the new chip, running at speeds up to 183MHz and sporting double the 3D performance and a 63 per cent improvement in 2D performance over its last generation design. Volume shipments began in late March. The Voodoo3 2000, 3000 and 3500 are priced at US$129.99, US$179.99, and US$249.99, respectively.

In March, Matrox announced its next-generation graphics chip set, dubbed the G400, at the Game Developer's Conference. GA-Source says an OpenGL installable client driver (ICD) is promised — but this comes from the same company that has yet to deliver a final ICD for the G200.

3DLabs has taken a leadership role with its new graphics chip — the Permedia 3. The new chip promises a full Open GL ICD at new levels of performance, but also a leading-edge bump mapping implementation. Unlike cards such as the NVidia TNT, which essentially "fake" bump maps by simulating variations in lighting by shifting pixels of a texture map toward a light source, the 3D Labs implemeation goes beyond embossing, by providing per-pixel calculation of a source map's lighting.

Intel's successor to the i740 chip is the i752. Joytech is one of the first companies to announce a product based on the new chip, and the specs of the Joytek Apollo 7520 indicate: Pentium III optimization, optional digital flat-panel support, software DVD at 30 fps — full screen mode, up to 133MHz SGRAM/SDRAM support, and PC98 and PC99 compliance.

The S3 Savage4 PRO has a 32MB frame-buffer and 300MHz RAMDAC, 32MB SGRAM/SDRAM and a maximum 143MHz clock speed. According to S3, key capabilities of the Savage 4 chip include AGP 4X, extended S3TC support, multi-texturing, digital flat-panel support, TV-out, enhanced DVD hardware support, stencil buffers and destination alpha features.

According to a recent article at news.com, IBM is getting into the 3D graphics business with the Fire GL 1, a chip meant to allow PC makers to build $3,000 computers with technology found last year in $6,000 systems. Customers for the FireGL 1 include Diamond Multimedia. CW

For Further Reading

http://www.ve3d.net/fux3d
http://frag.com/rage3d/
http://www.tcp.ca/gsb/reviews

Graeme Bennett is a regular CCW columnist and reviewer. Based in Vancouver, he is Senior Editor for The Computer Paper. He is a former computer reseller and can be reached at graeme_bennett@tcp.ca

Plug In!

CCW LAB TEST

The only Canadian test facility that generates monthly reports about computer equipment for the Canadian market-place.

If you want your product independently reviewed and the results delivered to resellers across Canada, you have one, and only one, choice — CCW LAB TEST.

JUNE
Ad Deadline: May 12
Distribution: Jun. 2
Hardware Focus: Multifunction Machines
Software Focus: Office Suites
Lab: Monitors

JULY
Ad Deadline: Jun. 16
Distribution: Jul. 7
Hardware Focus: Sound Technologies
Software Focus: Operating Systems
Lab: Motherboards

AUGUST
Ad Deadline: Jul. 14
Distribution: Aug. 4
Hardware Focus: Handheld Computers
Software Focus: Web Authoring
Lab: Printers

Eastern Office: (416) 535-8404 **Western Office: (604) 608-2688**

It's time for DVD to *Shine!*

Get ready for big sales of these drives. Check out our reviews of the latest DVD products.

by Sean Carruthers

Okay, the term DVD isn't exactly as ubiquitous as CD. Not yet!

Over the years, the compact disc has come to set the standard for getting a lot of data from developers to the end user. They're cheap to produce, can hold up to 650 megabytes of data on each disc, and can be used for either data or audio information. It's hard to imagine something replacing such a useful format, right? But DVD is positioned to do just that.

DVD (either "Digital Video Disc" or "Digital Versatile Disc," depending on who you ask), is the logical step up from the CD. It has the same form factor, is capable of holding data, audio or video information, and has a much higher storage capacity.

Bigger is Better

Advances in manufacturing technology have made it possible to compress the amount of space needed to store information on disc media so that a single side of a DVD is able to hold up to 4.7GB of data. Additionally, DVD uses a process of multi-layering to increase capacity by using a different frequency, the DVD drive is able to refocus the laser to a different depth at the media level. The media is capable of stacking two layers on each side, and by placing these double-layers back-to back, DVD media can also be double-sided, just like an old phonograph record.

With all of these techniques in place, the capacity adds up quickly, with a double-sided double-layered DVD disc capable of holding up to 17GB of data. That's more than 25 times the size of a standard compact disc. It's the perfect carrying media for multimedia applications, from large games to movies. The game Riven, for example, required a number of CDs and forced the user to switch between CDs repeatedly. With DVD, the game fits on one single disc, and game play becomes much smoother for your gaming customers.

When *CCW's* Lab first looked at DVD technology just over a year ago, we anticipated that DVD-ROM would become more successful than DVD video, but it hasn't happened, in the short term, at least. We could speculate that this has much to do with games: gamers tend to drive the market for newer, better and faster technologies, after all. So far, most games have been small enough to fit on one or two compact discs. As games become even more graphically intensive, you can expect more and more games to come out on the DVD format.

Let's Go to the Movies!

For your clients, one of the biggest current advantages to switching to a DVD drive is the ability to play DVD video discs from the computer, with the right software. These discs are being heralded as the certain replacement to VHS video tapes, for a few key reasons. First off, the discs have all the functionality that a VCR has, including freeze frame and slow motion. In addition, they can also add an interactive interface that allows the user to access cast information, change the language of the film (either audio or subtitles), view movie trailers, and other bonus features. Many movies shipped on DVD contain both the regular and letterbox (theatre format) versions of the movie. And they don't need rewinding!

DVD video is currently one of the biggest selling points for consumers interested in DVD-ROM technology. But like any other application, DVD movie playback takes up a percentage of the system's resources, and requires a software package to actually play the movies.

Video information is stored on a DVD disc in MPEG form, which can highly compress an analog signal into a relatively compact space by throwing away extraneous information and then compacting the other data. To view the video signal, the computer needs to decode the information and reassemble it into a motion picture. This can be done in software mode, although this puts a fairly large strain on the CPU of the computer running it. A 233MHz Pentium II can allegedly handle MPEG software decoding, but it would be better to opt for a 266MHz or 300MHz system. Nothing else should be running on the computer at the time.

A better option could be a hardware MPEG decoder card. With one of these onboard, all the hard work is taken out of the hands of the CPU and offloaded to a card designed specifically for decoding MPEG video. While the addition of one of these cards brings the minimum system requirements down to a Pentium 166MHz system (or thereabouts), the advantages of this can be felt even for users with a system fast enough to do software decoding. Not only does the

card free up the CPU, it also provides smoother video, less errors, and higher frame rates. Most MPEG cards also provide a way to output the signal to an external source, like TV or VCR.

Obviously, a hardware solution costs money. Users with faster computers can probably make do without the card but those with slower machines will have to weigh the extra investment against the value of DVD video.

Is It Compatible?

Your customers may have concerns about compatibility. "Will I need new hardware to accommodate the DVD drive?" "What will happen to all of my old CD-ROM media?" "What about rewriteable DVD?"

For anyone with a CD-ROM currently in their system, the installation should be as simple as removing the cables from the CD and attaching them to the DVD unit — for the ATAPI (IDE) units. SCSI versions of the DVD drives would require an internal SCSI connector and controller card to be in place. SCSI buyers may need to buy a controller card to accommodate the new unit.

The biggest misunderstanding about DVD comes from users who are concerned about switching to DVD after a few years of collecting software on CD-ROM format. It's worth reassuring your customers that old CD-ROM media is fully compatible with DVD drives. In fact, in addition to recognizing CD-ROM, DVD drives are capable of recognizing a variety of formats, depending on the drive. Most are capable of dealing with formats like CD-R, CD-RW and Photo CD, but some are compatible with more obscure formats, including new DVD rewriteable standards.

Right now, rewriteable DVD is a bit of a minefield, with manufacturers banding together in groups, each betting on the future of rewriteable DVD. Some are siding with DVD-R, others with DVD-RW, or still others with DVD-RAM. Although DVD-RAM appears to have the edge at the moment, no one format should be counted out just yet. Nonetheless, buyers looking for compatibility with a certain type of rewriteable DVD should exercise caution, as the different formats are incompatible with each other.

Testing

Testing this month was done using a 300MHz Pentium III system with 128MB RAM, and an 8MB ATI Xpert 98 video card. Software decoding of DVD movies was done using ATI's DVD player software, under Windows 98.

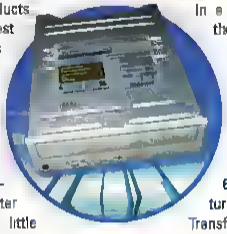
ADpen DVD-9632

Price: $225 (converted from U.S. dollars)

ADpen makes a lot of different products from systems down to the smallest components. This member of its DVD line is a 6X model.

In addition to the 6X DVD performance, the drive also has 32X CD-ROM performance and reasonable seek times. The slot-in loading mechanism means the drive can be mounted either horizontally or vertically in the computer without having to worry about little restraining clips on a tray. Using software decoding, DVD video playback was excellent on our test system.

A basic package, the box comes with the drive, drivers and a few cables. Users who want to play back digital video will have to provide their own DVD player software, and can purchase a hardware decoder board, if they're so inclined.



Samsung DVD Master 6X

Price: $159

In a company as big as Samsung, there's bound to be a lot of product ground covered. In the computer division, people know the company for monitors and hard drives among other things, and Samsung also offers a line of DVD drives.

The DVD Master drive is a 6X DVD solution, but also features 32X CD-ROM performance. Transfer rates are good and seek time is rated slightly better than normal DVD playback was excellent using software decoding on the test system, although a slight delay was noted when skipping tracks during movies.

The package is fairly basic, with a drive, drivers and a few cables. Users interested in video playback will need to supply their own DVD player software and buy a hardware decoder card seperately, if they want one. At $159 though, a lot of people are bound to be interested in this drive.

Creative PC DVD Encore DXR3 Kit

Price $379

Creative Labs has been doing quite well for itself in the multimedia field, with popular sound cards and a good graphics card line. The company also offers an all-in-one solution for those who want to add a DVD solution to a computer and want a hardware decoding solution.

At 6X, the Creative DVD is speedy with a good transfer rate. The 24X speed for reading CD-ROMs is a bit slower than some of the other drives tested this month, and the average access times were higher than the other units. The Dxr3 hardware decoder card comes with the package, provides smooth video playback under Windows 95/98 and has video output jacks for connecting to a TV or VCR.

While the DVD player software that comes with the package will only work in conjunction with the Dxr3 decoder card, the drive also provided excellent video playback when decoded by software using third-party video player software. The kit also features a software bundle including excellent DVD video player software, and complimentary DVD titles (our kit included a copy of Riven and National Geographic 90s). Although the kit is priced a bit higher than the other entries this month, the extra software makes this quite a good value overall.

Panasonic SR-8583-BMCA

Price $199

Panasonic has been a big name in the CD-ROM business for quite a while, so the company's prominance in the DVD field is natural. Although a Panasonic 6X model is due out on the market soon, it wasn't available for testing by our deadline. Instead, we had a chance to look at the most recent 5X model.

Though the 5X speed is slightly slower than the 6X drives, the speed is still pretty good on this drive, which also features full 32X CD-ROM performance. DVD playback was excellent on our test system, although some minor pixellation was evident when the drive was set as the slave drive on the primary chain.

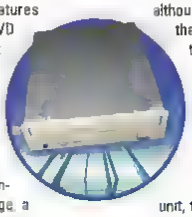
Panasonic also offers a bundle with a hardware decoder card from a third party, but the unit we tested comes without, at a cheaper price. For this package, a DVD player software package will be necessary in order to play back movies. Even without the frills, at $199, the Panasonic DVD offers good value.

Hitachi GD-2500

Price $145

Hitachi is well-known in the storage world, and this is a recent model in the DVD line. At 4X speed, it's not quite as fast as the other models tested this month, with slightly slower access times, but nonetheless, performance is still quite good.

Like the other drives, it handles all older CDs and the newer DVD formats. Transfer rates are a bit slower, but should be sufficient for most users' needs. (It's worth noting that 1X and 2X drives were capable of the performance levels required for DVD movie playback. At 4X, this drive still delivers a lot of speed and performance.) DVD playback was excellent on our test system while using software decoding, although pixellation was evident when the DVD was set as the slave on the primary chain. This was solved by moving the DVD to the secondary chain.



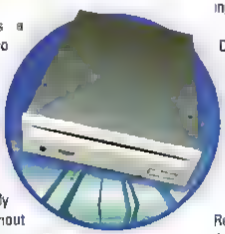
The GD-5000 ships without a hardware decoder card. Users may choose to purchase one separately.

Despite the slower speed of the unit, the lower price is bound to make the drive a very attractive choice. Hitachi drives are distributed in Canada by Supercom *(http://www.supercom.ca)*.

Pioneer DVD-103S

Price $225 (converted from U.S. dollars)

Generally better known for home audio and video components, Pioneer nonetheless has a hand in the component world.

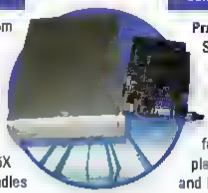


This 6X drive is a speedy solution, also offering 32X CD-ROM performance, high transfer rates and good seek times. The slot-in the loading mechanism is handy for those who want to install the drive vertically into a computer without having to worry about restraining clips on a tray. DVD playback was excellent on our test system, using software decode.

The package is pretty basic, including the drive, drivers and a few cables. Users looking to do DVD video playback will need to spring for DVD player software on top of this package and a hardware decoder card, if they're so inclined. The great performance and slot-in loading mechanism make this a very attractive drive.

Toshiba SD-M1202 Kit

Price $349 (converted from U.S. dollars)



Also a big name in the DVD home component world, Toshiba also offers a kit for users interested in bringing DVD to their computer.

The kit contains a 5X DVD drive, which also handles CD-RDMs at 32X speed. At only 256KB as compared to the 512KB found on the other drives tested this month, the buffer size is a bit small, but there were no performance issues noted on our test system. DVD playback was excellent using both software and hardware decode modes.

The Toshiba kit also offers the RealMagic Hollywood Plus hardware decode card and the Sigma Designs software DVD player. As with the above unit, set-up may be tricky, but NT and Windows 95/98 computers should be able to make use of the card.

At $349, the Toshiba kit is a bit less expensive than the other kits this month, and makes an attractive all-in-one solution.

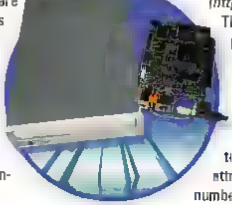
Sony DVD-RDM 5X Upgrade Kit

Price $349

Sony is big into DVD on the home component side. On the computer side, this kit contains the 5X DVD drive, a hardware decoder card from Sigma Designs and bonus software.

In addition to 5X DVD, the Sony drive also features 24X CD-RDM performance. DVD playback was excellent under both software and hardware decoding, although a slight delay was noted when skipping tracks during movies.

The RealMagic Hollywood Plus DVD software package runs only in conjunction with the hardware card included. Set-up was a bit tricky, and may provide occasional problems for users. On the plus side, the hardware card also can also be set up under Windows NT using drivers from the Sigma Designs Web site *(http://www.sigmadesigns.com)*. That added flexibility may make potential problems a lot less important for users who would like to be able to view movies in NT.



The Sony DVD kit also features bonus software titles, which should make it an attractive all-in-one option for a number of users.

	ACpen DVD-9632	Creative+C24 PC-DVD Encore 6X DXR3 kit	Hitachi GD-2500	Panasonic SR-8583-BMCA
DVD speed/CD speed	6X / 32X	6X / 24X	4X / 24X	5X / 32X
Disc input	slot in	motorized tray	motorized tray	motorized tray
Interface	ATAPI	ATAPI	ATAPI	ATAPI
Buffer	512KB	512KB	512KB	512KB
MPEG card	none	Dxr3	none	none
Rated transfer rate — DVD	8310KB/sec	6100KB/sec	5,520KB/sec	8,750KB/sec
Rated transfer rate — CD	4800KB/sec	3600KB/sec	3 600KB/sec	4,800KB/sec
Average access time — DVD	120 ms	180 ms	180 ms	140 ms
Average access time — CD	90 ms	120 ms	120 ms	95 ms
Media types accepted	DVD-RDM, DVD video, DVD-R DVD-RW CD RDM, CD Audio CD-I, CD ROM/XA, CD Extra Photo CD, Video CD, CD-R, CD-RW	DVD-RDM, DVD video, DVD-R, CD Audio, CD I, CD Extra CD-RDM CD RDM/XA, Photo CD CD-R, CD RW	DVD-RDM DVD Video, DVD-R CD-RDM, CD Audio, CD-RDM/XA CD I, CD Extra Photo CD, CD-R CD RW	DVD-RDM, DVD Video, DVD-RAM, DVD-R CD-RDM, CD Audio CD Video, CD ROM/XA CD-I Photo CD CD-R, CD-RW
Contact	1-888-852-6736	1 800-998-1000	1 800 949 4567 (Supercom)	1 800 265-0616
Website	www.acpeausa.com	www.soundblaster.com	www.hitachi.ca	www.panasonic.ca
Warranty	one year	one year	one year	one year
Price	$225*	$379	$145	$199

	Pioneer DVD-103S	Samsung SD-604	Sony DVD-ROM 5X Upgrade Kit	Toshiba SD-M1202 Kit
DVD speed/CD speed	6X / 32X	6X / 32X	5X / 24X	5X / 32X
Disc input	slot in	motorized tray	motorized tray	motorized tray
Interface	ATAPI	ATAPI	ATAPI	ATAPI
Buffer	512KB	512KB	512KB	256KB
MPEG card	none	none	RealMagic Hollywood Plus	RealMagic Hollywood Plus
Rated transfer rate — DVD	8,100KB/sec	8,100KB/sec	8 750KB/sec	6 536KB/sec
Rated transfer rate — CD	4,800KB/sec	4,800KB/sec	3,000KB/sec	4,800KB/sec
Average access time — DVD	120 ms	110 ms	115 ms	135 ms
Average access time — CD	80 ms	90 ms	100 ms	95 ms
Media types accepted	DVD-ROM DVD Video DVD-R, CD RDM CD Audio, CD Video, CD Extra Photo CD, CD R, CD RW	DVD-ROM DVD Video, CD-RDM CD Audio, CD Video CD-RDM/XA, CD-I Photo CD, CD Extra CD R CD-RW	DVD-RDM DVD Video, DVD-R CD-RDM CD Audio, CD Video, CD-I, Photo CD, CD-R, CD-RW	DVD-RDM DVD Video DVD R CD-ROM CD Audio CD Video CD-I, CD-RDM/XA CD Extra, Photo CD, CD R, CD-RW
Contact	1-800-850 1703	1-949-542 3535	1-800-961 7669	1 949-457 0777
Web site	www.pioneernewmedia.com	www.samsungcanada.com	www.sony.ca	www.toshiba.com/taecdpd/
Warranty	one year	one year	one year	one year
Price	$225*	$159	$349	$349*

*converted from U.S. dollars

Editor's Choice

Creative PC DVD Encore DXR3 Kit

All of the drives this month were perfectly capable of doing DVD movie playback via software decoding and all offered reasonable transfer and seek rates. Where Creative Labs' offering has the edge over the rest is that it's an all-in-one solution with a great bundle. The DVD player software package is powerful and easy to use, and the bonus titles included in the package add a lot of value to an already impressive kit. CW

Sean Carruthers is Lab Test Editor for Canadian Computer Wholesaler. Based in Toronto, he can be reached at sean_carruthers@tcp.ca

PC Market Moves Off the Desktop. Closing The Gap, Notebook Sales are Surging!

by Jeff Evans

This year, former niche markets are becoming mainstream. The "standard" Wintel desktop PC is being jostled by other categories of computers, including handheld devices, sub-$1,000 ultra-low-priced desktops, the resurgent Apple Macintosh, non-Intel computers, and notebooks!

The Big Three, and Company!

The notebook market is still dominated by three major players: Toshiba, IBM and Compaq. Between them, they account for about 70 per cent of total notebook PC sales. In conversations with *CCW*, representatives of all three companies pronounced a devotion to the channel — they are not going to dump their resellers in favor of the Dell-style direct model. Also, they all adhere to a soup-to-nuts approach to their notebook product menu. That is, wherever they see a potential market for a particular kind of notebook, they will offer a model with the features and price to appeal to the target users. By being full-spectrum vendors, Toshiba, IBM and Compaq intend to offer a complete range of choice to their customers, from enterprise power users to budget-minded small businesses and students. And the Big Three aim to continue to dominate the competition by offering "one-stop shopping" for notebook resellers.

This is the reason, according to an IBM Canada spokesperson, for the recent introduction of the IBM "I" series of low-cost notebooks. IBM detected a market demand for a small business and consumer notebook, with good applications performance at a low price. Compaq was able to put together an appealing new product line and market it, with the aid of the IBM brand, to a new customer base. And Toshiba's SatelLite series of notebooks has been particularly successful in attracting non-traditional notebook customers, who previously would have bought mid-priced desktop PCs. Many consumers will pay a small premium for the security of buying a name brand, but that premium is pretty thin.

What is a 'Desktop Replacement' Notebook?

Intel has been pushing hard in the last year-and-a-half to make mobile, low-power-consumption versions of its current Pentium chips available soon after the release of the desktop versions. The performance gap between notebooks has thus closed considerably, while notebook prices have also dropped substantially compared to desktops. This has meant that for most standard business applications, affordable but powerful notebooks can be offered to a wider range of end-users. The former business computing model, where a worker had a "real" full-powered desktop computer in the office, and a much lower-powered notebook for mobile work, is now almost dead.

Increasingly, mobile workers rely on a single computer either a desktop PC supplemented by a $400 3Com Palm unit, or a Pentium II notebook that does away altogether with the need for the desktop PC.

"True" desktop replacement notebooks for the power user are actually a small part of the market. Top-of-the-line models like Eurocom's 8500 line of super notebooks, (which feature 400MHz Pentium II processors, 15-inch screens, 12GB hard drives and sophisticated multimedia features such as DVD and videoconferencing), still cost two to three times or more of the price of their desktop equivalents.

'Normal' Power to Go

However, even a budget-priced, $2,000-entry-level notebook is an impressive system in mid-'99, easily capable of running Microsoft Office 97 and other business applications. Current notebook processors are based mainly on Pentium or Celeron chips running at 266MHz or better, and 32MB of RAM is the standard, with low-cost upgradeability available to 96MB or more. Notebook screens now start at 12 inches (nearly equivalent in viewable area to a 14-inch CRT monitor), and range up to 15 inches (equivalent in viewable area to a 17-inch monitor). Active-matrix screens cost only a couple of hundred dollars more than their passive equivalents, so the crisper, sharper TFT screens are now the mainstream choice. CD-ROM drives are generally a standard feature for most

Discover a new life form

LIFEBOOK

Built for Humans™

The evolution of business mobility has achieved a higher form of intelligence. For those who seek power, flexibility and the ultimate contact in their business life, there is now a simple answer: **Experience LifeBook**

L

LifeBook L Series
- Just 1.1 inches thin and 4.5 lbs. light*
- Detachable multi-funtion bay
- Choice of 366 MHz or 266 MHz Intel® Pentium® II processors
- Brilliant 13.3" XGA TFT display
- Platinum colour magnesium alloy casing

E

LifeBook E Series
- Two hot swapping multi function bays
- Precise and responsive ErgoTrac™ pointing device
- Choice of 366 MHz, 333 MHz or 300 MHz Intel® Pentium® II or 300 MHz Intel® Celeron® processors
- Brilliant active matrix displays

B

LifeBook B112
- Compact size: 9" x 6.7" x 1.5"
- Only 2.65 lbs.*
- 233 MHz Intel® Pentium® with MMX™ Technology
- 8.4" SVGA TFT colour display with touch screen capabilities
- 3.2 GB hard drive
- Platinum colour magnesium alloy casing

FUJITSU

FUJITSU CANADA, INC.

(905) 602-5454, 1-800-263-8716 www.fujitsu.ca

EMJ	Pro-Data	Supercom	3D Micro	Samtack	Tech Data	Cybernétique Technologie M.R. Inc.
(519) 837-2444	(403) 250-8881	(905) 415-1166	(905) 472-8622	(905) 840-1890	(905) 670-8899	Québec/Atlantic: 1-800-461-0622
1-800-265-7212	(604) 207-9210	(604) 276-2677	(604) 273-8328	1-888-874-6372	1-800-668-5kbe	1-418-656-0622
	1-800-567-3274	1-800-348-4567	1-800-468-1079			

notebooks, and the price of other peripherals such as removable media drives, modems, networking cards, extra hard drives and RAM have all declined steadily.

Though cost continues to drop, there is still a substantial price differential between notebooks and desktop PCs — which remains a barrier to the really budget-conscious customer. The extra cost of ruggedization and miniaturization, and the cost of a color LCD screen, make a sub-$1,000 notebook a difficult proposition for the near future. However, the proliferation of name-brand notebooks selling for street prices in the $2,000 to $2,500 range has meant that notebooks are stealing sales from the middle to upper end of the desktop PC market. Meantime, the sub-$1,000 PC segment is accounting for most of the growth in desktop computer sales.

Reality Check: The Enduring Limitations to Notebooks

Not everything is perfect in the notebook industry, however. In addition to price, resellers should keep in mind some basic limitations to the average notebook. Particularly for home or small business users, the graphics capabilities of notebooks don't match those of desktops, in certain respects. It's now very common for a desktop PC user who wants good graphics to select an inexpensive graphics card with 16MB or even 32MB of RAM, plus high-powered 3D and digital video capability. For games players or DVD fans, it still makes more sense to go with a desktop PC. Although graphics chip leader ATI has announced some powerful new graphics solutions for the notebook market, gamers will probably stick to desktop PCs (or video games consoles) for the time being.

IBM ThinkPad 570

Expandability is also a problem. Though with USB connectors (and, coming soon, high-speed IEEE 1394 FireWire ports), it is becoming easier to attach peripherals to a notebook. A desktop PC is still significantly easier and cheaper to upgrade, with extra hard drives and high-bandwidth home Internet services such as cable modems and DSL than a notebook. However, the synergistic effect of the surge in notebook sales is having a positive effect — the more notebooks that are sold, the cheaper notebook components and peripherals tend to become, enabling the sale of yet more notebooks.

Security is perhaps the major negative flipside to the benefits of mobility. Thieves also appreciate the easy portability of notebooks, which are easy to steal, and lucrative to sell.

Resellers should take advantage of a significant margin opportunity by recommending unobtrusive carrying bags, encryption, disk-lock and tracing software, plus theft insurance, for both the loss of hardware and disruption of business.

And remember the dangers of breakage. The travelling life is hard on computers. Here, for especially rigorous applications, a partial (and expensive) option is ruggedized computers, such as those from Dolch and Panasonic's ruggedized lines. Extended warranties and good service options are also major profit opportunities for resellers.

With the increase in screen sizes, hard drive capacity and multimedia features, current notebooks are big power consumers. Resellers have the opportunity to sell either more sophisticated (and expensive) notebooks with the latest in battery and power saving technology, or to simply sell extra batteries. But in general, resellers should accept that the margin on the basic low- to mid-range notebook models will be modest. The key to profitability and customer satisfaction, is to sell a complete solution, from soup to nuts: notebook, extra battery, printer and other peripherals, software, security features, extended warranty and carrying case, for example.

Fighting to Get In

Outside the territory staked out by the Big Three, there are numerous smaller players fighting for market share. In spite of often excellent product offerings, most other players really can't match the product range and depth, and the extensive channel support programs of the Big Three. It's also hard for the smaller players to compete against the brand awareness of the established players. In response to this challenge, the small notebook companies in Canada attempt to differentiate themselves in ways that appeal to a specialist or niche market, and which leverage particular features or technologies that set them apart from the crowd. For example, Eurocom, with an emphasis on its big "no compromise" desktop replacement notebooks, has been highly successful in this regard.

The Future

Of course, 1998 saw some notebook innovations that are now becoming less expensive and hence more common in mobile computers this year. Ultra-thin notebooks (around one-inch thick), usually with a rigid magnesium lid, are the norm for lightweight (four to five pounds) high-performance notebooks. Universal Serial Bus is well on its way to becoming — well, universal, along with a host of USB-compatible peripherals such as printers, Zip drives and LS-120 SuperDisk drives. A new category of Windows CE-based computers, with sub-notebook-sized screens and keyboards, but with much lower power consumption and higher battery life, debuted last year from vendors such as Sharp and Hewlett-Packard. We should know by the end of the year if there is a real market for products that combine aspects of a handheld with a notebook PC. The regular drop in price of large-sized color LCD screens seems to have screeched to a temporary halt. The global increase in notebook sales, leading to greater demand, and the delay in constructing new LCD fabrication plants due to Asian economic problems, have in some cases resulted in actual increases in the costs of notebook screens.

Within a year or so, however, the trend to lower notebook screen prices may resume. And Intel, perhaps to forestall competition from AMD and Cyrix, has aggressively dropped prices of its Celeron and Pentium chips, a major factor in allowing the improved price/performance of 1999's notebooks.

In the future, wireless connectivity options will likely become cheaper and more widespread, enabling high-speed connection to the Internet for the roaming user. Ultra lightweight notebooks with high performance will drop in price. Multimedia features such as DVD and 3D sound will also become more mainstream. The basic functionality and form of the notebook computer will likely continue to revolve around the constraints imposed by the human hand and eye. Keyboards have to be of a useable size, and screens have to be sufficiently large and bright to view detailed spreadsheets and Web pages. Within these

constraints however, expect to see a weird and wonderful assortment of mobile computing devices testing the limits of the latest in technology and the demands of the mobile computer users

Some Players

Acer — *(http://www.acer.com)* After buying the Texas Instruments notebook line, Acer has declared its intention to make a major push in the notebook market. Recently, Acer America Corp. announced a new thin and light Travelmate 330 notebook computer. Weighing in at 4.1 pounds, and averaging one inch thick, the new 330 offers a multimedia and business applications punch at a super-portable weight. Anthony Lin, general manager of Acer America's Canadian division demonstrated the new product in *CCW*'s offices, emphasizing innovative features such as a top and bottom magnesium chassis for strength, and a quick-connect dual floppy and CD-ROM/DVD drive which hot-plugs into the 330 as needed. The new Acer 330 offers a full-sized keyboard and a 13-inch screen.

Apple — *(http://www.apple.ca)* Although the Apple Mac PowerBook line's market share has declined from its peak of up to 24 per cent of Canadian notebook sales around 1990, there is still a devoted user base for the PowerBook, especially in the graphics/communications field. Apple's revitalized desktop computer line has made all the headlines recently — the new Apple mobile offerings are expected sometime later this year, and if Apple has the right stuff, it could achieve notable increases in sales and public awareness.

Compaq — *(http://www.compaq.com)* Originally famous for its pioneering luggable mobile computers, Compaq was embarrassed to find itself pushed out of the top spot in the notebook market by Toshiba and IBM. Over the last two years, Compaq has matched the other two big notebook vendors with a constant stream of new business and consumer notebook models.

Dell *(http://www.dell.ca)* The bête noir of the reseller channel, Dell sells all its notebook products directly, either by phone or over the Internet. Dell actually dropped out of the notebook business during the early '90s, before re-launching a notebook line around 1994.

Dolch — *(http://www.dolch.com)* Perhaps the most exotic mobile Windows PC maker, Dolch makes industrial strength luggable PCs designed for the most hostile, demanding military, mining, manufacturing and other stressful working environments. Starting around $10,000, Dolch's computers are unique and only recently have Panasonic's line of ruggedized notebooks begun to compete with Dolch in the high end of the tough mobile market.

Eurocom — *(http://www.eurocom.ca)* The only Canadian-based notebook maker in the Top 10, Eurocom aggressively incorporates the latest technology in a range of well-priced, well-made notebook models which span the range from entry-level to high-powered, high-tonnage super notebooks, which feature 15.1-inch screens, DVD video, and lavish mass storage options.

Fujitsu — *(http://www.fujitsu.com)* Traditionally best known in mobile computing for its handheld Stylistic line of pen computers, Fujitsu has recently released a new notebook line that includes ultra-thin, ultra-light models that allow the user, by stripping off a modular "slice" containing CD-ROM or floppy drive, to reduce the weight and power consumption of a business notebook.

Hewlett-Packard — *(http://www.hp.com)* First out of the gate in '98 with a stylish line of ultra-thin, metal-skinned notebooks developed in association with Matsushita (Panasonic), HP has been working hard on building its corporate notebook sales for the last year.

IBM — *(http://www.ibm.com)* IBM sees mobile computing as an important part of its spectrum of solutions that ranges from a version of the handheld 3Com Palm Pilot (named WorkPad by IBM), on up to enterprise level supercomputing. IBM is also a major innovator of notebook technology, with inventions including the TrackPoint pointing device, the "Butterfly" fold-out keyboard, advanced power management technology, and the world's highest capacity, miniature hard drives. On April 19, IBM Canada announced a new ThinkPad model, the 570. It's designed to be used with a snap-on UltraBase which can accomodate a variety of CD-ROM, DVD, Zip, LS-120, hard drive or other optional components.

NEC/Packard Bell — *(http://www.nec.com)* A promising up-and-comer a few years ago with its innovative a notebook line, NEC has had some tough sledding in Canada recently, at least in part due to management turmoil. The product line is first rate though, and the company should be able to remain a strong tier-two supplier.

Panasonic — *(http://www.panasonic.com)* Building on both a strong ruggedized notebook line, and a good marketing campaign, Panasonic has effectively addressed the need of part of the market for very durable, reasonably priced notebooks. A number of Canadian police departments have chosen Panasonic's rugged notebook computers to replace the outdated terminals in thousands of police cars. Panasonic has announced the 2.6-pound, 1.4-inch thick ToughBook 33, with an 8.4-inch screen, 266MHz Pentium MMX processor, and up to six hours of battery life.


IBM ThinkPad 1410

Sharp — *(www.sharpelectronics.com)* Once a leader in the Canadian notebook market, Sharp bowed out of the field several years ago, settling for being a supplier of flat-panel screens and other components to third-party notebook manufacturers. But more than a year ago, Sharp announced a recommitment to the North American market, with ambitious plans for large scale manufacturing in the U.S. This ambition to become a big player in the notebook field has yet to translate into large Canadian market share.

Sony — *(http://www.sony.com)* Sony added the VAIO notebooks to its product lineup about a year ago, offering perhaps the best-looking designs in the notebook field, along with leading-edge technology (FireWire connections and video manipulation software). Its channel strategy has been to avoid head-to-head competition with the Big Three in the enterprise market, instead aiming at the individual technophile/early-adopter/small business consumer.

Toshiba — *(www.toshiba.com)* Toshiba has generally been first in market share for the past six years or so. Both IBM and Compaq claim to have matched or beaten Toshiba in some recent quarters, but Toshiba claims that by some analysts' measures of units shipped, its Canadian market share has been as high as 39 per cent recently. Whatever the true numbers, Toshiba remains a premier notebook vendor. On the basis of notebook sales alone, Toshiba ranks as the fifth largest seller of computers in Canada. CCW

Palm V:

Luxury. Style. Quality. And that's just the stylus!

Product: Palm V • Vendor: 3Com Corp. • Price: $679 • Rating: B+

by Keith Schengili-Roberts

Though Apple's Newton may have been the first handheld computer on the market, it wasn't until the advent of the Palm Pilot that things really began to take off. 3Com has recently expanded the line with recent launch of the Palm IIIx and the Palm V. Each are aimed at a different sets of users — the Palm IIIx is aimed at the power-user and the Palm V aimed at those who crave style and luxury. If you think of the Palm IIIx as a heavy-duty four-by-four truck and the Palm V as a sleek sports-car, you've got the right idea. The Palm V has the best set of features of any Palm Pilot, but it comes with a price to match. It may look good, but its equally slim memory configuration will minimize its appeal to the power user.

The first thing you'll notice about the Palm V is its small size. The new Palm V is the lightest, slimmest model in the Palm Pilot line. It weighs in at only 4 ounces and measures 4.5 by 3.1 by 0.4 inches. One of the things that bulked out previous incarnations of the Pilot was the fact that it had to reserve space for two AA batteries. The Palm V dispenses with need for AA batteries, using slim, rechargeable lithium ion batteries instead. The lithium ion battery recharges whenever you place the Palm V in its cradle, and it can go from being completely drained to fully recharged in three hours.

One possible drawback lies in the fact there's no easy way to replace the lithium ion battery when it eventually dies. The battery has long lifetime and a full charge is rated for a month of use.

Another desirable enhancement (which also appears in the Palm IIIx) is the screen, which provides better contrast than previous versions of the Palm Pilot. The improved LCD display means that there is less reflectivity in bright light and much better viewing in dim light. The back-lighting is also much improved in the Palm V. Instead of lighting up the entire screen, it lights up everything in reverse, minimizing both the light required to illuminate the screen effectively and the power necessary to do so.

A groove runs along both sides of the Palm V — a stylus is designed to fit into one groove and the other holds the flap for the cover. If you're a lefty, this means you can exchange the positions of the stylus and the flap.

The soft rubber cover barely bulks out the unit when it goes into a pocket, unlike the relatively bulky hard covers of previous models. There is also a new base station with this model. It has a heavy metal base, making it easy to jot notes on the Palm V while at a desk, without knocking the unit over. The Palm V and Palm IIIx also boast slightly faster CPUs, which means that Graffiti recognition is significantly zippier than in previous models.

Though the Palm V is designed to appeal to those who like style, it is distinctly under-powered compared to its sibling, the Palm IIIx. The Palm V contains only 2MB of RAM, which is the same as that on the Palm III, but half of that found on the Palm IIIx. Another major drawback of the Palm V for power users is its lack of expandability. Its slim form factor does not allow for much in the way of additional memory, or any of the other devices that normally fit into the extra memory slot found in previous models. 3Com justifies this by saying that it found many users do not use all of the existing memory on their Palm Pilots, but for those who do, the Palm V may be more style than substance.

While the Palm V may be short in terms of memory or expandability it is not lacking in other desirable features. Despite the dramatic stylistic change with the Palm V, the real differences with this version as opposed to previous incarnations are incremental improvements to its usability. According to 3Com, the Palm V is aimed at the "image conscious." If you think of the Palm line of PDAs as being BMWs, the Palm IIIx is like a BMW 300 series model, and the Palm V is like a BMW 350. Both will get you from point A to point B, but the BMW 350 will take you there with more style, if not necessarily more horsepower. And you can expect to pay a premium for the pleasure — $679 is the current suggested retail price for the Palm V, as opposed to $549 for the new Palm IIIx (and $449 for the Palm III). There's no doubt that the Palm V has the sleek lines and the speed, but if you are looking for power and room for expansion, aim for a Palm IIIx instead.

But for a price, your customers can get a Palm V and be the coolest geeks on the block!

Pros:

- Powered by rechargeable lithium ion batteries
- Half the thickness of the Palm III
- Better contrasting screen
- Best-looking Palm Pilot yet.

Cons:

- No room for expandability
- Pricey.
- Under-powered for its price

Keith Schengili-Roberts is a Toronto-based journalist who specializes in high-tech reporting and is author of The Advanced HTML Companion *from AP Professional. He can be reached at robertsk@wave.home.com.*

Overclocking:

What are Your Customers Getting Into?

Alan Zisman

Microcomputers were probably about one week old when the first users discovered it was sometimes possible to trick the CPU into running faster than the manufacturer intended, otherwise known as overclocking. As a reseller, it's not legal for you to overclock a system, then sell it as a faster product. But some of your customers will take overclocking upon themselves, so you should have a good understanding of the issue. Be sure to advise them that they're probably invalidating their warranties[1].

However, it's an age-old practice for the speed-seekers. Speeding up the 6MHz 80286 in the IBM AT was pretty common — at least until IBM hacked the BIOS so it refused to start up at any but the officially designated speed.

Still, overclocking is illegal — at least if it's done at the retail level, with stores selling, for example, a 300MHz CPU overclocked to 400MHz, and advertised as a real 400MHz processor. But while overclocking can void warranties on processors, there's no law against what a customer does with a product once it leaves the store. And in the last year or so, overclocking has become increasingly popular, at least with some groups of customers.

The boom in overclocking is due to a few factors:

- Game players want to squeeze as much performance as possible out of their systems, while spending as little as possible.
- Intel's original Celeron lacked a Level-2 cache. While this made it a sub-par performer for standard business applications, it was easy to overclock, often to spectacular levels.
- There's a wide price spread between the Celeron and Intel's official high-performance CPU lines: the Pentium II and now III.

Suddenly, many buyers were hot rodding Celeron/266 CPUs to speeds close to 400MHz, resulting in a system that performed like a Pentium II/400 at a fraction of the cost. With recent steps taken by Intel to limit overclocking, this fad may soon die down. You certainly shouldn't be selling systems running at higher than their rated speeds. But some of your customers are probably planning to hot-rod their systems, and you should know what they're taking on and what some of the issues are. Web sites have sprung up filled with information aimed at overclockers. Some of the favorites include:

- Anandtech — *http://www.anandtech.com*
- Firing Squad — *http://www.firingsquad.com*
- SharkyExtreme — *http://www.sharkyextreme.com*
- System Optimization — *http://www.sysopt.com*
- Tom's Hardware Page — *http://www.tomshardware.com*

(Firing Squad is claiming more than seven million hits per month — an indication of the popularity of overclocking.)

Overclocking is done by playing with a motherboard's CPU multiplier and bus speed, in order to send faster signals to the CPU. A stock Celeron/300 CPU in a 66MHz bus would use a 4.5 multiplier, for example: (4.5 x 66 = 297MHz). If the multiplier is left at 4.5, but the bus speed is upped to 100MHz — the CPU is suddenly running at 450MHz. (There may be problems with 66MHz RAM doing that, however.) Or if the bus is left alone, but the multiplier is upped to 6.5 — the CPU is running at about 422MHz, while not stressing out the RAM.

Some of the peculiarities and pitfalls:

- Some motherboards make it easier to do this fiddling. A current favorite is the Abit BX6 series. While other popular boards, like ASUS's models, require changing jumper settings for every clock multiplier or bus speed alteration, with the Abit boards it can be done through software (much nicer!). As well, while some systems force the users to choose either 66MHz or 100MHz bus speeds, Abit (and some others) allow a range of speeds in between.
- Changes should be made in a series of small steps. Eventually, users will hit a threshold, beyond which they'll start to see system problems, so back up a small step.
- All CPUs are not the same. Even all CPUs of the same model and speed rating are not the same — two seemingly identical Celeron/300s may max out at different speeds, and a few may not allow overclocking at all. A poll on the Sharky site suggests 90 per cent success pushing C-300As to 450MHz, however.
- Faster CPUs tend to be less overclockable, with reports that Intel is taking steps to make it more difficult to overclock the newest Celeron/433 models. (Sharky Extreme reported disappointment at being unable to push a Celeron/433 past about 468MHz, after having pushed a Celeron/366 all the way to 550MHz).
- The biggest problem with overclocking is the potential of overheating the CPU. Firing Squad recommends adding thermal paste (a cheap Radio Shack purchase) between the CPU and the heat sink. Adding fans and heat sinks is highly recommended, especially in extreme overclocking situations. Vancouver consultant Bill Drake praises the Global Win fan (Model FAB-24) — a dual fan unit. He points out that it's like having a backup in case one fan stops working.
- Users should be careful when upping the CPU voltage (an option with the Abit motherboards). A small adjustment can increase the speed at which a system can boot, but too big a change can fry the CPU. A Celeron can be boosted from 2.0 volts to 2.1 volts, and maybe to 2.2 volts, but that's about it.
- There is the potential of risk in overclocking. Of note, 16 per cent of the people responding to a poll on the System Optimization site reported damaging a CPU or computer component.

Users who've successfully overclocked a CPU will find their systems may perform better in some ways, but not necessarily in others. CPU benchmarks will improve, but that doesn't always mean much in the real world. Even games may not show as much improvement as hoped for. If Quake is already running at an optimal frame rate, overclocking won't lead to much visible improvement — but there may be improvements in situations that would have previously stressed the system. However, 3D rendering and Adobe PhotoShop image editing — both of which are pretty CPU intensive — could benefit. But business applications won't show much, if any, improvement. CCW

Alan Zisman is a regular CCW columnist. Living in Vancouver, he is a computer journalist and teacher and can be reached at azisman@home.com

Reader Poll

VOICE YOUR OPINION

Last Issue, We Asked:
As the world buzzes with discussion about the Y2K bug, and the upcoming turn of the millenium, which most closely reflects your view of what to expect on Jan 1?

You Said:

4% This whole thing has been severely over-hyped and there won't be any major Y2K-related effects on business or society

65% There may be certain isolated Y2K-related problems

26% There's a risk of some serious system failures, due to unresolved Y2K issues

4% Major catastrophes around the globe are very likely, due to Y2K

Our Question to You:
There's been growing discussion about flat-screen LCD monitors. Which most accurately represents your opinion of short-term sales prospects for flat-screen technology?

- ☐ Pricing has come down to the point where many consumers will now start switching over to flat-screen products
- ☐ Flat-screen technology is of interest to customers, but not quite inexpensive enough to make many people switch over from the CRT just yet.
- ☐ The resolution and performance of flat-screen technology has almost reached the point of general consumer acceptance, but still needs some work
- ☐ Most people aren't ready to accept flat-screen displays yet, for price or technology reasons, and it will be quite awhile before flat screens go mainstream

Win FREE software!!

Vote in our Reader Poll! A randomly drawn winner will get a copy of Symantec's TalkWorks Pro Version 2.0 voice and fax message system.

Congratulations

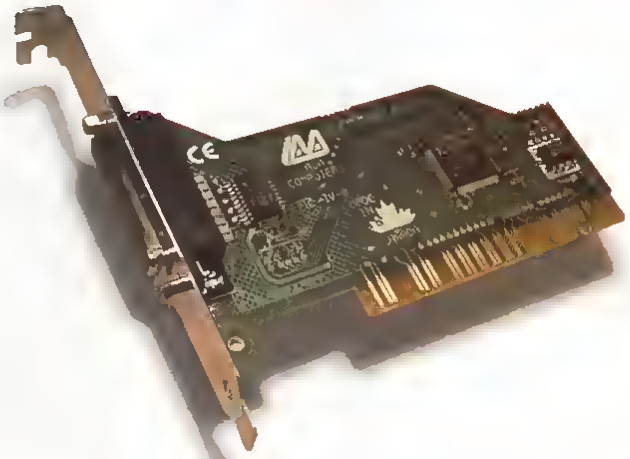
Congretulations to the winner of IBM's ViaVoice 98 Executive continuous speech recognition product: Dave O'Connor, partner at Nepean-based AMO Consultants

Log in to our Web site: **http://www.ccwmag.com**, E-mail: *ccw@tcp.ca*, or send your responses, and comments, by fax, to: **(604) 608-2686**

LAVA

www.lavalink.com

PC I/O Specialists!



Lava is a Canadian designer and manufacturer of PC I/O boards, specializing in high-speed serial & parallel ports. Established in 1984, Lava has gained a worldwide reputation for meticulous attention to detail, and unmatched manufacturing quality standards.

Contact us for information on Lava products and many others, and let's discuss your dealer requirements and how we can best serve you.

Pro-Data

Visit the Pro-Data Website - www.pro-data.com

CONTACT:	B.C.	ALBERTA		MAN./SASK./N.W. ONT.
	RICHMOND	CALGARY	EDMONTON	WINNIPEG
	PHONE (604) 207 9310	PHONE (403) 250 6681	PHONE (780) 413-8210	PHONE (204) 779-9960
	FAX (604) 207-9351	FAX (403) 250-7706	FAX (780) 413-8212	FAX (204) 779-9361

Out of Town Dealers call 1-800-567-3274

Studioworks

Enjoy the View

The New LG Studioworks 15", 17" & 19" Monitors

Designed for mainstream business & home office applications, the new trio of LG Studioworks monitors delivers sharper, crisper pictures and comes with a range of advanced features, including on-screen digital microprocessor controls, special screen coating, high resolution, and high refresh rate. For real performance, at a more affordable price, choose monitors from a world leader, LG

	575N	775N	910C
Size	15"	17"	19"
Pitch	0.28	0.28	0.26
Max Res	1280 x 1024 @ 60Hz	1280 x 1024 @ 80Hz	1600 x 1200 @ 80Hz
Horiz. Scan	30~70 kHz	30~70 kHz	30~100 kHz
Tube	Invar	Invar	Invar Mask
Feature	Digital OSD	Digital OSD	Digital OSD, TCO '95
Warranty	3-Year	3 Year	3-Year
Instant Demo Rebate	$20	$40	$60

Demo Offer

$60 off invoice for 19"*
$40 For 17" and
$20 For 15" Monitors

**One per location. Contact your LG distributor for more information*

LG **LG Electronics**
WE PUT PEOPLE FIRST

www.lge.ca/reseller

PROJECTION DESIGN 1-800-265 7212 | INGRAM MICRO 1-800 INGRAM | MERISEL | PE Peripherals Express | Samtack

For more information call 1-800-461-2802